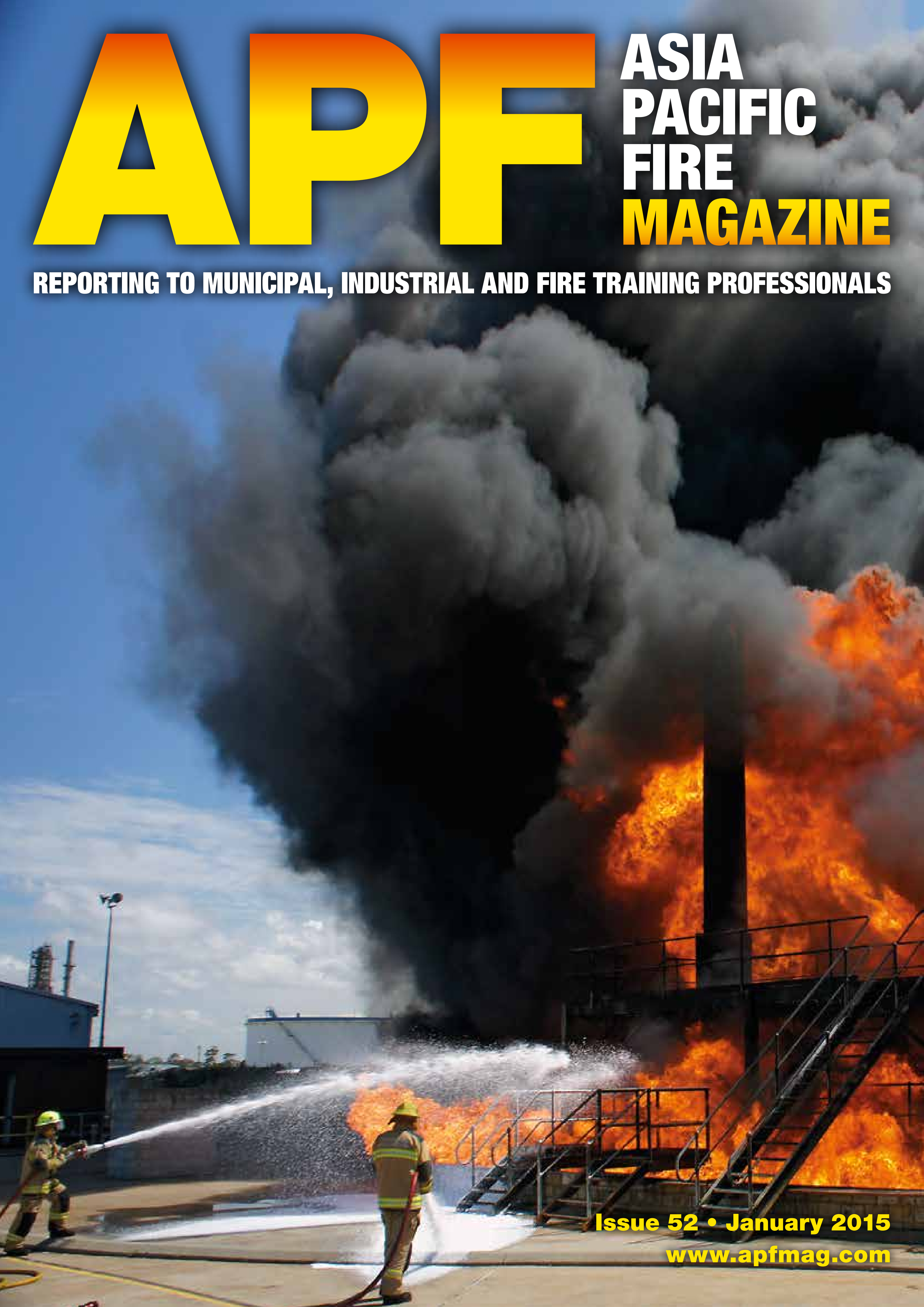
APF

ASIA PACIFIC FIRE MAGAZINE

REPORTING TO MUNICIPAL, INDUSTRIAL AND FIRE TRAINING PROFESSIONALS

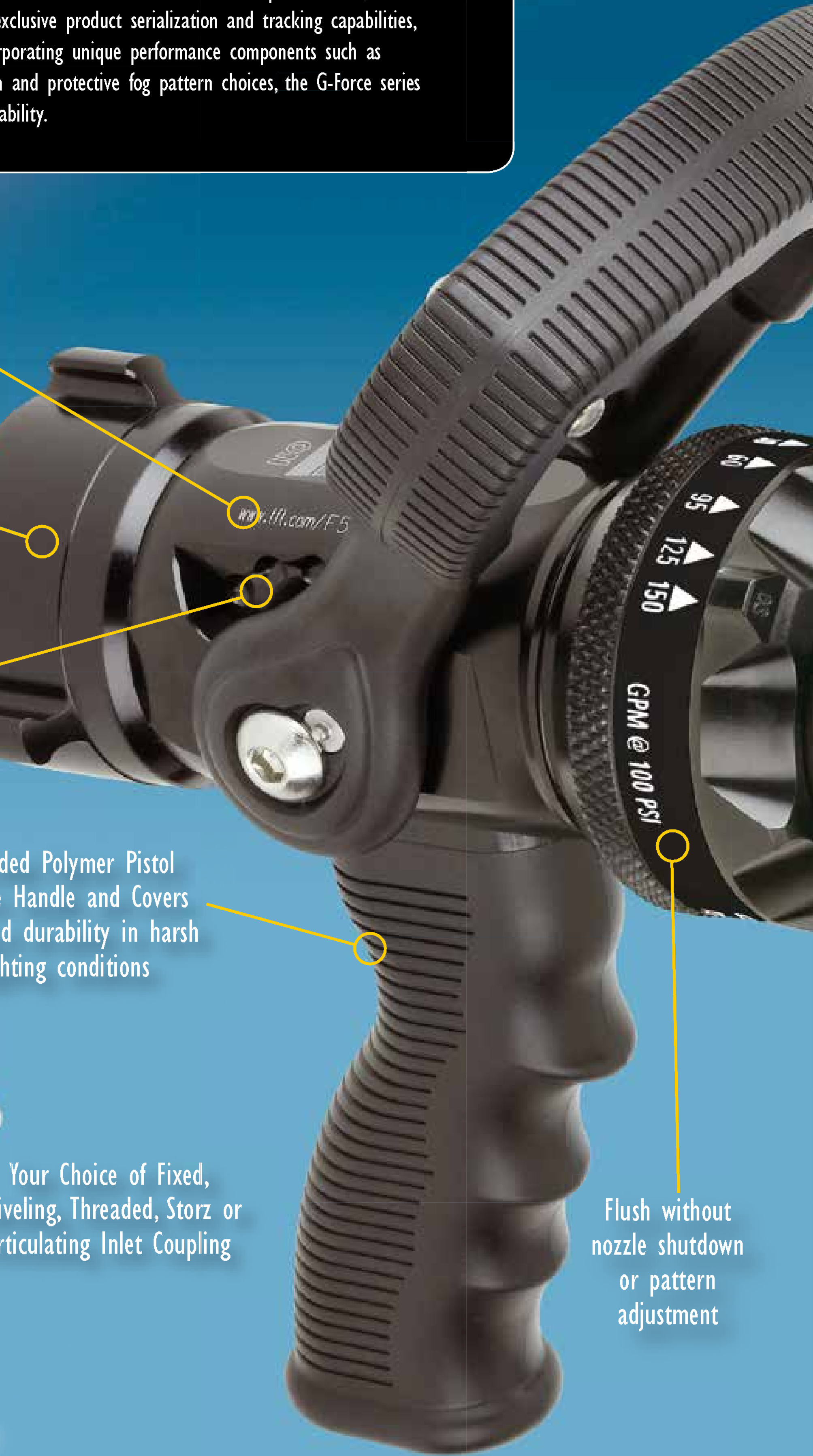


Issue 52 • January 2015

www.apfmag.com

G-Force Nozzles: The Inside Story

Based on a highly customizable global nozzle platform design, the unique G-Force series of fixed, selectable, and automatic nozzles combine over 40 years of Task Force Tips design innovation and experience into true next generation firefighting tools. Manufactured exclusively at TFT's USA production facilities, the G-Force series is supported by an extensive infrastructure of 24-hour technical service representatives, on-line documentation, digital video training library, exclusive product serialization and tracking capabilities, and a proven 5 year product warranty. Incorporating unique performance components such as a stainless steel slide valve, inlet debris screen and protective fog pattern choices, the G-Force series delivers high performance and rugged dependability.



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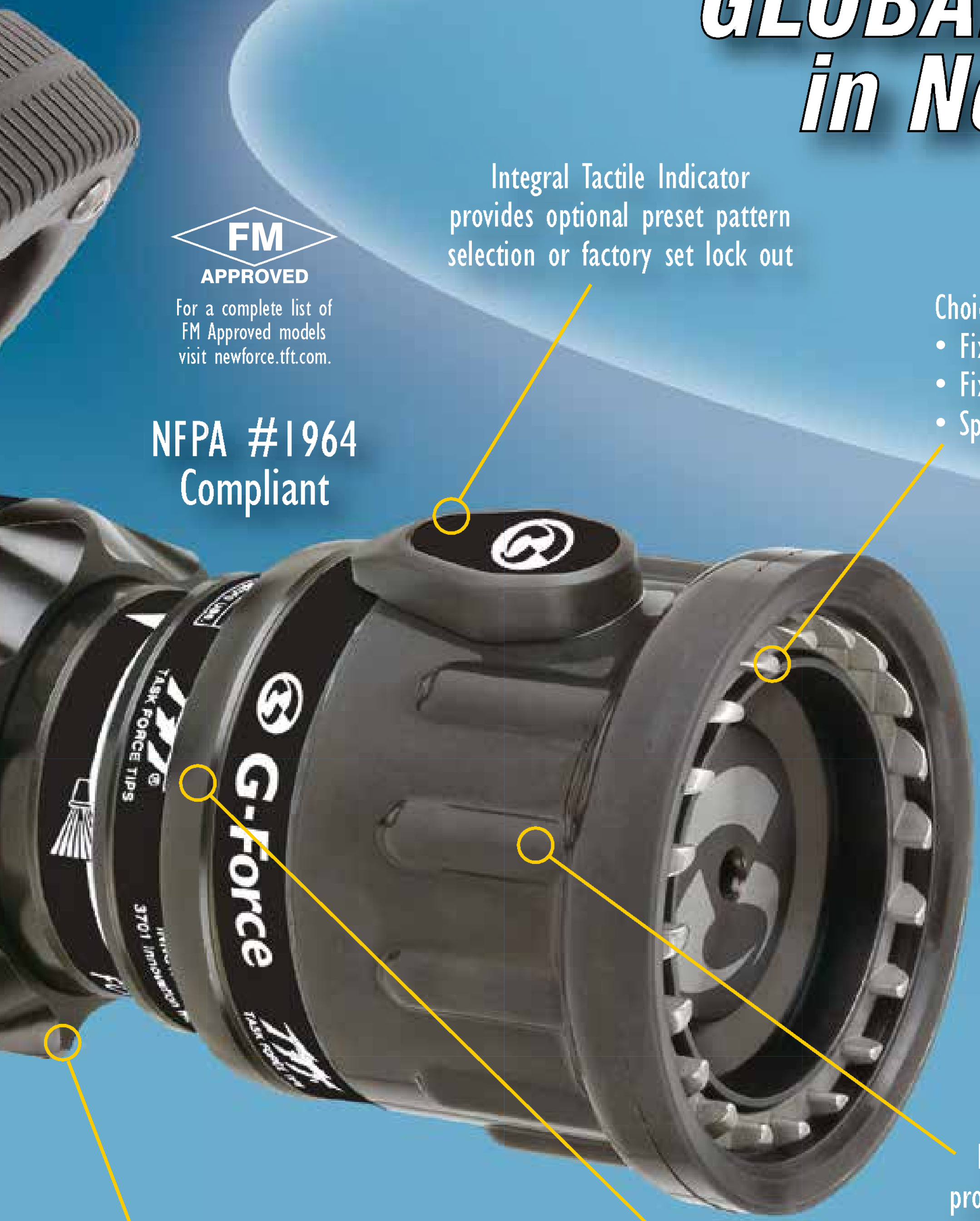

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Integral Tactile Indicator provides optional preset pattern selection or factory set lock out

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- 3 Automatic Pressure and Variable Flow Choices

Choice of:
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Contents

JANUARY 2015

REGULARS

5 APF Comment

7 NFPA Vision

9 News and Profiles

FEATURES

25 Intersec 2015 Profile & Showcase

29 Multi-Zone Protection via High-Pressure Total Flooding

33 Clean Agent Enclosure Design

41 PPE / PPC: The Last Line of Defence

49 Reaching Communities in Disasters

53 Detector Options for Down-stream System Performance

58 Lighting the Way with Pelican Products

63 Foam Suppression Systems – What You Need To Know

70 21st Century Decontamination Where Are We Going?

75 Major Advances in Respiratory Protection Standards

79 No Deployment without Communication

82 Distributor and Representative Offices

88 Advertisers' Index

41

58

63

70

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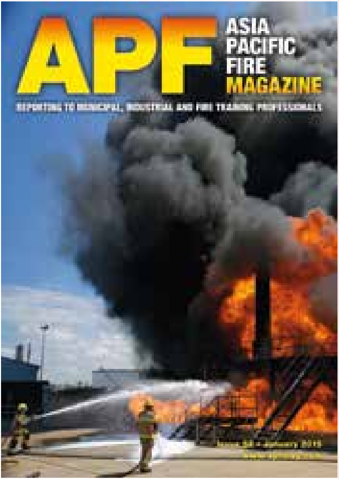
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Cover image: Solberg Foam School – Fire service and emergency response personnel from municipal and industrial brigades test their firefighting skills on simulated large scale industrial fires at the Whyte Island Fire Campus of the Queensland Fire and Rescue Service in Lytton, Australia.

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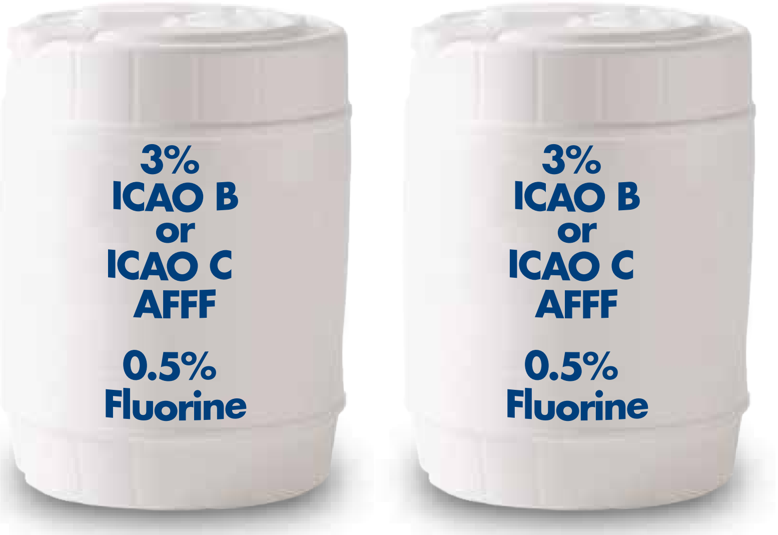

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Tomorrow’s Paradigm

This is the last editorial I will be writing for *Asia Pacific Fire*. After five very enjoyable years I feel it is time for me to move on. It is also an opportunity for me to speculate on what the future fire prevention, firefighting and rescue landscape might look like across the Asia Pacific region in the coming years. So here goes.

Graham Collins

Editor of Asia Pacific Fire Magazine

Let me first take a look at fire prevention. While in some Asia Pacific countries there is still a long way to go before fire safety legislation is both in place and – equally important – enforced rigorously, fairly and universally, the arsenal of detection and alarm technology is, I feel, more than adequate to meet the challenges. Manufacturers continue to invest time, energy and money into ever-improved solutions that undeniably have the potential to further safeguard lives and protect property. I use the word “potential” because I see the biggest strides that can be made in fire safety in the coming years are going to be in improved awareness and training. And not just for fire prevention professionals; in particular I have in mind greater awareness and training for the general public and building owners and occupiers.

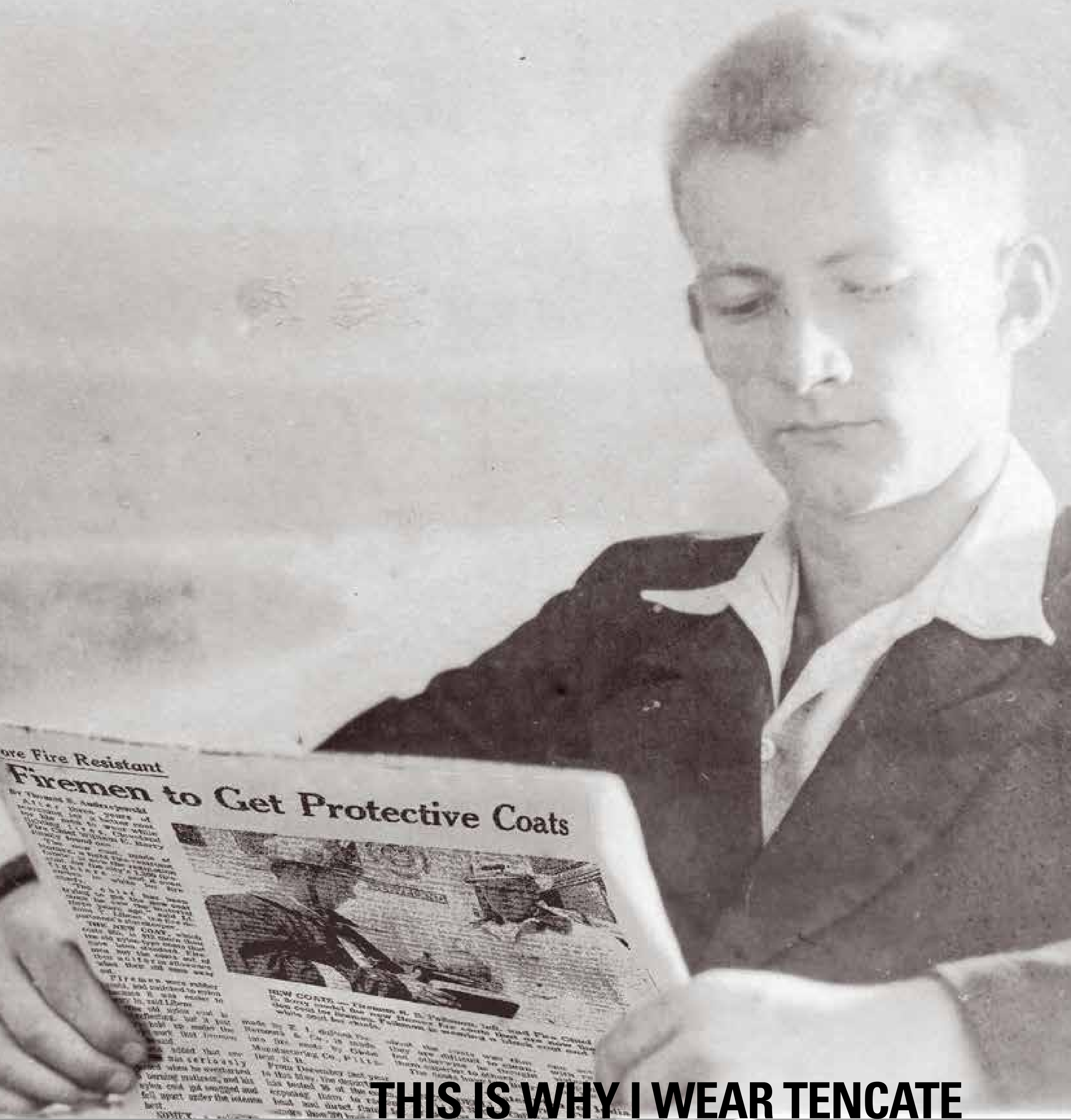
All too often we hear about fires being caused by what can only be described as stupidity (like allowing fireworks to be let off inside crowded nightclubs); people dying in buildings because of complacency (when, for example, exits are blocked by stored goods); negligence (as when fire systems are not maintained properly); apathy (such as not taking the likelihood of a fire and its consequences seriously); and sheer ignorance on the part of people completely unaware of what to do in a fire or other emergency. Hopefully, a time will come when these shortcomings are addressed across the entire region, in effect forming a robust fire prevention partnership between the profession, proprietors and the public.

The landscape for firefighting and rescue operations is, I believe, going to be dominated by climate change and the sooner we move away from argument and counter-argument as to whether or not it is man-made the better. The reality is that climate change is a fact. Indeed, I would contend that it is not so much climate change as climate big change. We are going to have to contend with the impact of natural disasters that are more frequent and more severe.

According to the Japan Meteorological Agency, NASA, and the University of Alabama, the world has just had its warmest October on record, with the planet on course towards its hottest ever year. Australia is about to face a particularly tough bushfire season; New Zealand has just been hit again by a 6.5 magnitude earthquake that rocked the east coast of North Island; this year China had its deadliest landslide for six decades; and floods have killed thousands across Asia. The list goes on, and these events are going to place unprecedented demands on the emergency services.

So we have to move away from any notion that these disasters are not going to happen. Most scientists will tell you that it is now when, not if. Alarmingly, some scientists are already expressing the view that it is too late to ward off some of the consequences of the political, industrial and life-style decisions we have taken in the past and continue to take. Some of you may recall the 1989 film Field of Dreams in which Kevin Costner was told: “build it, and he will come”? We seem to have too many decision makers around that subscribe to a similar but more alarming belief, namely: “ignore it, and it won’t happen” (well, not during their watch anyway). Sadly, I believe it will.

Finally, in closing on this less than optimistic note, I would like to thank all of the contributors from across the Asia Pacific region that I have had the pleasure of working with, and I hope we will meet again, as I am planning to stay closely involved in this fascinating and vitally important industry in which we all have a part to play.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Caveat Emptor

I took three years of Latin in secondary school, figuring it might help me become a doctor or lawyer. Instead, I became a firefighter and, truth be told, Latin came in handy prepping for emergency medical technician exams and executive fire officer legal classes.

Kenneth R. Willette

Public Fire Protection Division Manager at NFPA

I have been thinking a lot about a particular Latin term lately. The idea of caveat emptor – "let the buyer beware" – is one we all need to understand, particularly when evaluating how products are designed to provide protection to responders during activities in environments that are immediately dangerous to life and health.

Caveat emptor implies that buyers should inspect or review a product thoroughly to ensure it meets the buyer's needs. I can think of plenty of occasions when I have used caveat emptor as my guiding light: the hours of research I invested in finding the best neighbourhood to purchase a home, checking consumer reviews before purchasing a new washing machine, reading the nutrition labels on prepared foods for the nights I cook (or warm up) dinner. In a global market place, as "global consumers", it is essential that we do our homework to make sure we get the best value for our investment.

As a buyer of equipment for the fire service, do you perform the same level of research? How closely do you scrutinise personal protective equipment (PPE), such as structural firefighting ensembles and self-contained breathing apparatus? How exacting are you when it comes to selecting electronic safety equipment (ESE) like thermal imagers? You can certainly try on the PPE and test the performance of the thermal imagers, but those are not the only tools at your disposal to help you make an informed decision on these critical pieces of equipment.

You can also rely on more than a dozen NFPA standards to habet bonam electionem auxilium diam – "help the buyer make a good choice." These documents provide recommended practices for the design, testing, and certification of PPE and ESE. To assist buyers and users, these standards recommend each piece of compliant PPE or ESE have a permanent label affixed that states explicitly that it meets the requirements of the relevant standard. For example, on a thermal imager it would read: This Thermal Imager Meets the Requirements of NFPA 1801, Standard on Thermal Imagers for the Fire Service, 2013 Edition. Do Not Remove This Label.

Note that the label does not say the equipment is approved, tested, or certified by NFPA, as NFPA does not provide those services. The PPE and ESE standards require independent, third-party testing and certification of compliance with the relevant standard and that the certification organisation's label be included with the NFPA compliance and manufacturer's label. The presence of that label allows responders across the globe to verify if a particular piece of PPE or ESE meets the minimum NFPA standard design and performance criteria developed by a diverse technical committee, with members drawn from responders, experts in the field, manufacturers, researchers, labour, regulators and the public. Their collective efforts result in recommended design, testing, and certification practices that reflect the dangerous environment responders operate in.

When evaluating PPE or ESE, look for the label – It is your confirmation that the equipment is NFPA-compliant and can serve as a benchmark as you evaluate comparable, labelled products. You can be confident that they have been independently tested and certified to a specified level of performance. That is how caveat emptor is transformed into emptor saturabuntur – "a satisfied buyer."

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Rosenbauer is the international technological leader in firefighting technology. Many Rosenbauer staff members are active in fire and disaster protection themselves and are familiar with typical conditions on scene. They develop powerful firefighting equipment and perfectly coordinated system solutions from this experience, so that everything works just right in an emergency. Resulting in excellent firefighting technology for successful operations.
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News

Leader Sentry Duty for USAR

The **LEADER** Sentry provides additional security for USAR personnel when entering a dangerous structure. A simple program setting of the laser ray of the Sentry detects the slightest movement of a structure or mass that may endanger rescuers.

Two Sentry laser sensors can be linked simultaneously to monitor two different structures or two axis of movement of the same structure. If the movement of the structure under surveillance exceeds the warning threshold chosen, a powerful 98 dB alarm siren and a flashing light are activated to warn of an impending collapse, alerting rescuers to evacuate.

Among its many feature, the Sentry offers: a laser beam range of 30 meters; adjustment by increments from 5 mm to 100 mm to determine the acceptable maximum threshold of movement; a clear control screen showing movement in real time with the choice of imperial or metric measurement; the possibility of multi-sources power to be operational in all situations; and an automatic switchover to AA batteries back up if the main power source fails.

For more information, go to www.leader-group.eu

Chinese Approval for Detector

FIRE FIGHTING ENTERPRISES (FFE) has received CCCf (China Certification Centre for Fire Products) approval for its Fireray 5000 optical beam smoke detectors, allowing the company to distribute them in China.

Using infrared beams, optical beam detectors can identify smoke over much larger areas than traditional fire detection devices, making them perfectly suited for large indoor spaces. They work by transmitting a beam of invisible infrared light across the building space to be protected. Usually wall-mounted at near-ceiling level, a receiver detects and measures the light and can recognise smoke interference anywhere along the beam path, triggering the alarm signal when the pre-determined threshold is reached.

The Fireray 5000 in particular excels at detecting smoke over very large distances (up to 100 metres). The motorised, reflective, auto aligning infrared system can be installed with up to two detector heads per system, saving on installation time and costs. In addition, each system controller houses two pairs of fire and fault relays, one for each detector.

For more information, go to www.ffeuk.com

New Lightweight Hand Pumps Launched

HOLMATRO has launched a new range of compact hand pumps to drive a variety of hydraulic rescue tools during different operations, ranging from vehicle rescue to emergency response. Made of high-grade aluminium and equipped with a glass-fibre reinforced handle, the new pumps are, says Holmatro, lightweight, robust and easy to carry.

A higher oil flow enables users to complete their actions quicker than before, and the new range features a ‘push & unlock’ system for immediate release of the pump handle, comfortable soft-grip operation, a hydraulic oil level indicator and a built-in funnel. The range includes hand pumps for single-acting or double-acting equipment, as well as special models to use with Holmatro’s hydraulic PowerShore shoring system or door opener HDR 50. A foot pump is also available.

For more information, go to www.holmatro.com

New Night Vision Camera

FLIR SYSTEMS has announced the release of the all-new PathFindIR II thermal night vision system that uses the company's latest night-time video analytics algorithms, providing automated detection and alerts of pedestrians and animals, so firefighting and rescue vehicle drivers can see hazards sooner at night from up to four times farther away than with just the vehicle's headlights.

Made in cooperation with technology partner, Autoliv, the PathFindIR II adds a night-time pedestrian detection feature that can be configured to automatically display alarms that alert drivers when the system detects a person nearing or crossing the vehicle's path. It provides the power to see through smoke, find victims and guide hoses onto fires in all conditions.

For more information, go to www.FLIR.com

The only true multi-use helmet

According to **LEADER**, its Sar helmet has been designed to meet the highest levels of protection combined with the highest possible levels of comfort and usability. Lightweight and comfortable, the helmet is said to offer a high level of impact protection that gives the wearer excellent protection from impact/shock both from above or from the sides.

The all-risks Helmet is suitable for many applications. It is tested to eleven different standards giving it the versatility to be used in a wide range of applications including: search and rescue, confined space and CBRN environments; water rescue, swift water operations, marine RIBs and hovercraft; forestry firefighting, wildland firefighting and general area search; and technical Rescues.

It is available in many colours including Hi-Viz yellow, Hi-Viz orange, white, red, black, royal-blue, olive green and navy blue, and is available in police, marine and security colour options.

For more information, go to www.leader-group.eu

Sprinkler Head Facility Opened

EXOVA WARRINGTONFIRE, the specialist fire and security testing and certification provider, has expanded its sprinkler head testing capabilities in Australia in response to anticipated demand for new testing requirements introduced by Australian Standard AS1851-2012, which will now see sprinkler heads tested at 25 years after installation and then every ten years thereafter.

Local drop off points are also available for the transportation of samples to Exova's laboratory in Dandenong, Victoria, which will perform the release temperature, functional test and leak resistance testing for sprinkler heads.

Exova Warringtonfire's facility accredited by NATA for an extensive range of tests, and the laboratory is a Registered Testing Authority in accordance with the National Construction Code.

For more information, go to www.exova.com

Foam Concentrate Receives Award

Firefighting foam concentrate and system hardware company, **THE SOLBERG COMPANY**, has been named as a winner of the 2014 EPA (the US Environmental Protection Agency) Presidential Green Chemistry Challenge Award. The company achieved the Designing Greener Chemicals category award for its development and commercialisation of its Re-Healing foam.

Re-Healing foam concentrates are an environmentally sustainable fluorosurfactant and fluoropolymer-free firefighting foam used to extinguish Class B fuels with no environmental concerns for persistence, bioaccumulation or toxic breakdown.

For more information, go to www.solbergfoam.com

100 Years of Fire Detection Innovation

This year marks a major milestone for the VIGILANT fire detection brand. The company celebrates 100 years since it introduced its first automatic fire alarm and detection product, the Vigilant Thermostat Fire Detector that was patented by Matthew Maloney back in August 1914.

Today, Vigilant continues to innovate with a dedicated New Zealand research and development centre based in Christchurch. The centre has been in continuous operation for the past 100 years and during this time has built an impressive bank of world-class specialist expertise in the area of fire detection technology.

Thermostatic heat detectors rely on a bimetallic element that converts temperature changes into a mechanical displacement, using similar principles to how a heater thermostat works. The original Vigilant fire detector developed in 1914 had a long metal tube that enclosed an internal solid metal bar touching a small lever. Under sudden heat, the outer tube expands faster than the inner bar, releasing the lever. When electrical contact is made it rings the alarm. While today's fire detection products are more compact, this simple, highly reliable, mechanical technology developed by Mathew Maloney 100 years ago is still used today.

New Zealand's first fire detector was developed based on an observation that Mr Maloney made while working as an electrical engineer for the New Zealand postal service. While out on the job he noticed that the copper telephone lines were sagging and making contact with the iron electrical wires, but they would suddenly jerk taut again whenever a cold southerly wind blew. These observations led him to invent and patent the first Thermostat Fire Detector.

In the early years there were many challenges in developing fire detection technology due to the lack of public appreciation for fire detection products. For the three decades since first patenting its Thermostat Fire Detector, Vigilant installed approximately 200 fire alarm systems in public buildings, but it was not until the disastrous Ballantynes Department Store fire in Christchurch on 18th November 1947, which claimed 41 lives, that the attitude towards fire protection changed.

During this time a range of different fire detectors and control panels were designed, patented and marketed with Vigilant undertaking exhaustive trials. Working with the New Zealand Government, alarms were installed in many government buildings and connected to fire brigade stations.

While the look of fire detectors today has changed dramatically from the long thin probes originally used to collect heat, the bimetallic disc in today's detectors is very small and lightweight so it operates very rapidly, with small holes in a circular collar used to collect heat from the air. Analogue addressable technology has also been introduced, which provides a continuous reading about how much smoke or how much temperature there is in an affected area. Unlike the original invention that required a search for the fire, addressable technology can identify a particular detector in a particular room so one can immediately identify which room is being affected.

New innovations also include sophisticated microprocessor technology. Vigilant's MX1 is an example of a new generation analogue addressable panel that uses IP networking to enable computer-style communication between fire detection panels and to annunciators. This technology is very effective for large scale venues and premises, such as universities and hospitals, where dedicated fire detection networks run separately to other networks.

As demand for products that can assist with the orderly evacuation of large premises grows, the Vigilant research and development team in Christchurch is leading innovation in fire detection technology and mass notification systems that can help lock-down sites and communicate with occupants during a large scale emergency. Such technology that goes beyond fire protection is what the industry can look forward to in the coming years.

Today Vigilant, as part of the Tyco Fire Protection group, leverages global expertise by collaborating with research and development experts globally and will continue to lead innovation across the ANZ region.

For more information, go to www.tycosafetyproducts-anz.com

MDM Publishing appoint new Editor

MDM PUBLISHING LTD is delighted to announce the appointment of Neil Bibby as Editor of Asia Pacific Fire (APF) Magazine. Neil will take up his new role with effect from January 1st 2015.

Neil's background is in the management of fire services, he was CEO of the Country Fire Authority (CFA) for seven years, one of Australia's largest fire services with 60,000 volunteers and career staff across more than 1300 fire stations. Prior to the CFA he was an Assistant Chief with the Melbourne Fire Brigade. He has spent over 37 years in the fire industry.

Neil is currently Chairman of the Emergency Services Foundation a charity looking after the families of Emergency Management workers killed in the line of duty. He has completed the Australian and UK Brigade Command Courses and has worked with the UK, USA and Chinese fire services on common issues.

He was the Australian Director on the International Association of Fire Chiefs, Asia and is a past Chairman of the National Aerial Firefighting Center and Fire Protection Association, Australia, as well as a past member of the board on the Bushfire Cooperative Research Centre.

Neil has worked on aid projects helping to build the emergency services in Vietnam, Papua New Guinea and Fiji. He has a strong governance background, as well as being on many Boards he is a Fellow of the Australian Institute of Company Directors.

More recently Neil has been Managing Director of VectorCommand Ltd, Australia a UK company using new technology in command systems and training, and Executive Chairman of Capstone Partners assisting companies with early stage commercialization.

Mark Seton, publisher of APF magazine said, 'the directors and staff of MDM Publishing Ltd are looking forward to working with Neil.

New ASD Launched

APOLLO FIRE DETECTORS has added an EN54-20 approved point-based aspirating smoke detector (ASD) to its range of specialist detection products. It has an IP65 enclosure, which provides protection against ingress from the environment. The code protection controls and bespoke removal key provide protection against vandalism and tampering.

Available in two variations, both use Discovery optical detectors and are fitted with a mini-switch monitor that allows for the monitoring of fail-safe fault relays. A maximum of 50 metres of sampling pipe can be utilised on a single chamber (ASD-1) and the dual version of this product allows for two 50-metre sampling runs (ASD-2). It is designed to operate in a wide range of environments and is often used in secure facilities where anti-ligature and anti-vandal are requirements; in lift shafts where access is difficult; in wet or dusty environments or in clean environments where access is restricted.

For more information, go to www.apollo-fire.co.uk/discoveryasd

TLX Actuator Meets New Supervision Requirements

TLX TECHNOLOGIES has unveiled an actuator for fire suppression systems with active installation supervision that is compliant with NFPA 2001, Sec. 4.3.4.1, which will be required on all clean agent fire extinguishing systems by 1st January 2016.

The new UL recognised component allows for fully engaged installation detection to be configured to exact requirements. According to TLX its rugged construction, ultra-fast response and the ability to be reset, ensures consistent performance over the solenoid's entire 15-year life span. In addition, TLX can adapt the supervision capabilities to a pneumatic actuator for slave cylinders.

For further information, go to www.tlxtech.com

Gore Sets Global Performance Standards

Since their introduction to fire services over 25 years ago, Gore's specialist high performance fabrics have set new standards for firefighter protection around the world. Gore has become a global leader in all of the diverse market sectors that it operates in as a result of a unique corporate culture that encourages entrepreneurship and innovation, backed by sound research and development.

Gore associates are experts in their field and have a detailed understanding about the environment that a garment will be worn in, taking into account the way it will be worn and all the environmental factors that may affect comfort and protection.

Gore products are often employed where performance and reliability are critical – whether in the human body, in an engineering plant, on the fire-ground, on Mount Everest or in outer space. The company is steadfastly committed to standing behind the reliability of every product, in every application. That commitment is backed by robust research and development programs in support of every product.

Gore's world famous Gore-Tex and Crosstech fabric durably waterproof and breathable moisture barriers protect firefighters every day across the Americas, Australasia, Europe and the Middle East. It is a success story that is the result of the deepest commitment to quality, which starts with the promise that: "Our products will do what we say they will do".

The introduction of Gore's high performance fabrics created a durable layer in firefighter PPE that keeps the wearer dry by preventing water from entering the garment but allows sweat to travel out the other way. This minimises the build-up of moisture inside the garment and in more extreme conditions, which are often experienced by emergency responders, reduces the risk of heat stress and burns.

Gore fabrics undergo the most extensive and stringent testing regimes, which is just one of the reasons they consistently outperform alternative products. The company's own test laboratories are comparable to those used in many of the independent institutes and in many cases the company has developed specific test methods where previously no standardised tests existed.

From the start of the testing process, every aspect of the product's real-world use is examined in detail to inform the design and engineering process. It is important that protective clothing is functional and comfortable and Gore designers will advise manufacturers on potential innovations like special closures or waterproof collar solutions. All Gore fabrics comfortably exceed International PPE performance standards. They maintain that level of performance thanks to outstanding resistance to wear and abrasion and the ability to consistently retain high breathability and waterproofness after exposure to extreme heat. Gore products are renowned for their consistently reliable thermal stability.

If your risk assessment has identified a specific risk from blood borne pathogens, then Crosstech fabrics will deliver the solution, while keeping the responders dry and protected from heat and flame. Crosstech fabrics far exceed competitive products in test laboratories and in the field.

The family of Crosstech products also includes Crosstech products with Airlock spacer technology, to create an insulating air cushion. The result is a garment that is around 20 percent lighter, creating greater freedom of movement for the wearer. Crosstech fabric is used in structural firefighting ensembles and specialised urban search and rescue suits as well as boots and gloves.

If your risk assessment has not identified blood borne pathogens as a specific risk for your responders then the range of Gore-Tex fabrics will provide a durable, waterproof, breathable solution that delivers protection far in excess of laboratory test standards. Gore-Tex fabric is also available in the Airlock spacer technology variant.

Gore's unique approach combines research, innovation and an unwavering commitment to quality that has resulted in state-of-the-art protective fabrics that are fundamental to the protection of firefighters today, setting the benchmark in their class. Crosstech and Gore-Tex products lead the field in waterproof, breathable protection. Gore fabrics deliver an unbeatable combination of proven performance, durability and comfort that firefighters trust.

For more information, go to www.gore.com

Key Factors Influencing Today's PPE

Today's firefighters are demanding customers and rightly so. They want their personal protective equipment (PPE) to provide them with maximum protection, but they also want their turnout gear to be as comfortable, mobile and light as possible.

There is a common misconception that the lighter the fabric in the garment, the greater its breathability. Our own Hainsworth Titan 1220 has a conditioned weight of 220gsm, while similar garments are 205gsm and even 195gsm. Tests have shown that such differentiation in weight does not affect the thermal performance of the product. It is a balance between open weave and thermal protection in which the lighter fabric has a denser fabric construction offering thermal protection even at lighter weights.

A much more important factor in determining the performance capabilities of a firefighter's PPE is the fabric construction. Manufacturers such as Hainsworth are able to maximise the comfort, thermal performance and durability of firefighter garments by carefully positioning different fibres such as PBI and Nomex with Kevlar and yarns with different physical and mechanical properties within the fabric structure. These fabric structures enhance breathability, durability and thermal performance.

A huge amount of science lies behind the development of today's PPE. At Hainsworth, we are able to call upon 230 years of textile innovation, leading to a detailed understanding of how the placement of fibres can be maximised to best effect.

Hainsworth's UKAS-accredited laboratory carries out a range of standard tests to evaluate specific textile properties, looking at both physical (for example, tensile/tear strength) and chemical (for example, colour fastness).

Tests have consistently shown that a fabric's effectiveness with regard to breathability can be reduced when packed with too many fibres and yarns. Phase changing aramids like Nomex need room to move during heat energy exchange and their ability to absorb heat energy can be impeded if the yarns are too closely packed, while the passage of vapour and moisture may also be restricted. Ultimately, there is a need for balance between understanding the chemistry – the physical performance of the fabric's structure and how it performs in different situations and environments – and understanding what you are trying to achieve from the structure within the garment assembly.

Set against these considerations is the reality that firefighter PPE is constantly having to evolve. This is partly due to the changing role of the modern firefighter, but also due to the speed of innovation and technological advances available to the industry. A holistic approach to PPE is therefore critical in today's constantly evolving world; an approach that places equal emphasis on design, protection and quality, taking fully into account the vast and complex array of duties which our firefighters are expected to perform.

Heat stress is the single biggest issue facing firefighters today. Fabric design technologists have started to take more consideration of this risk with the fabric they design. Advances in PPE have meant that garment outer-shells have increased breathability taking into consideration the flow of air and vapour over the moisture barriers, while inner lining systems such as Hainsworth's Eco-Dry Active now take account of how they actively pull and push moisture and heat away from the body.

Manufacturers also have to ensure that their garments are also able to give the firefighter the greatest possible defence against the worst case scenario of a "flashover". This is when the structure of the garment and its complex chemistry is tested to the absolute limit.

It is not about individual factors such as whether a garment is lighter, more comfortable or offers greater mobility. Equally, it is not about the number of fibres or yarns that go into the creation of a garment or its moisture management or flame retardancy capability.

It is the interplay of abrasion, strength, construction and the flexing compression and extension of a fabric that affect the total performance of the fabric and the garment in real-life situations. The way these factors affect each other dictate the wear life, thermal protection and comfort offered by the garment to the wearer.

For more information, go to www.protectsyou.co.uk

DQE Helps Prepare for Ebola Scenarios

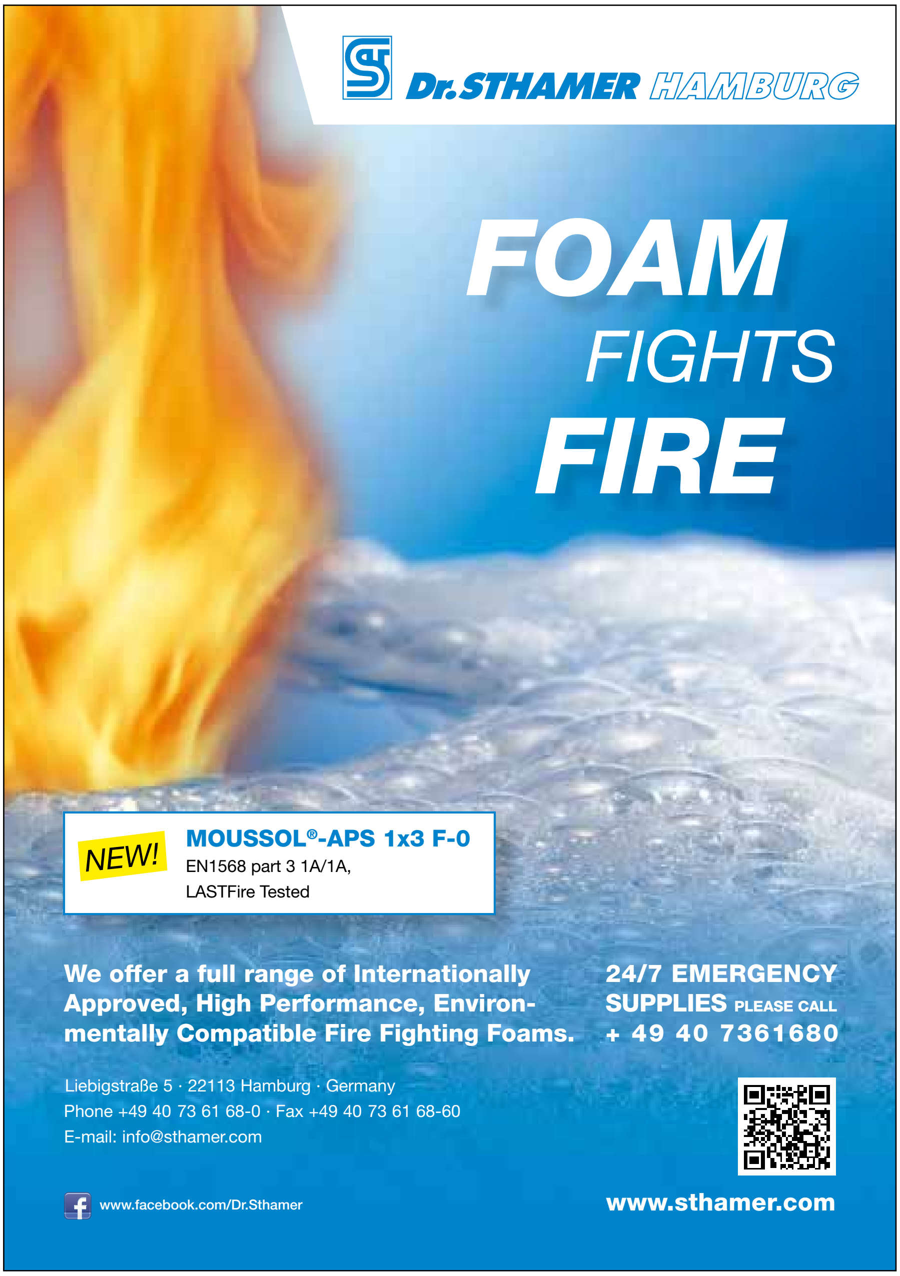
Since the first laboratory-confirmed case of Ebola was diagnosed in the United States on September 30, 2014, healthcare and emergency responders have rushed to provide the proper protection to their staff. DQE has been there every step of the way to ensure that customers have the protection they need for infection control. Orders have been limited to healthcare and emergency response personnel only, so that those with the greatest need receive them first.

"The SafePaq blood and virus protection kit has been our best selling product for the past two weeks," says DQE president Tony Baumgartner. "We have been answering calls non-stop and helping our customers prepare for an infectious event. These are the types of events that we plan for and DQE is continually updating its supplies to support the evolving CDC standards." The SafePaq provides coveralls that meet ASTM F1670/F1671 Standards for blood and viral penetration resistance. Its contents provide a foundation of protection against a wide range of fluid and viral threats and have applications in healthcare settings as well as with emergency responders who may encounter a patient with an infectious disease.

"Another product we carry that has a significant application to waste management during an infectious outbreak is the Sani-Bag+," says Baumgartner. The Sani-Bag+ is used, removed, sealed, and disposed of without the caregiver having direct contact with the waste, therefore eliminating the possibility of cross contamination from infectious microbes.

By sending infection control supplies to support healthcare workers around the United States and the world, DQE is fulfilling its mission of being ready now for what's next.

For more information, go to www.dqeready.com/InfectionControl



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LHD Group – Leading the Way in PPE

The LHD Group, headquartered in Cologne in Germany, was founded in 2002. The internationally active group of companies was created as a public private partnership between the German Federal State and the German forwarding company Hellmann Worldwide Logistics GmbH & Co. KG, and the US manufacturer Lion Apparel Inc. With the purchase of the jas AG in 2008, the LHD Group was able to expand its portfolio in the sectors of fashion and design.

In 2009 the company took over large parts of the Lion Apparel Group of companies, the worldwide leading manufacturer of personal protective clothing and equipment for fire services. For more than 110 years, the Lion brand has been a synonym for functional and high standard protective, special clothing and uniforms.

Today, LHD Group is the leading provider of innovative, comprehensive solutions for corporate fashion, work wear and uniforms, as well as personal protective equipment and counts among its customers big international carriers (road, rail and air), retailers and forwarders, as well as armed forces, the police, fire brigades, security personnel and customs officers.

The range of services offered by LHD encompasses design consultancy and product development, procurement, logistics, distribution, tailoring, laundry, dry cleaning and repair. Due to the combination of qualified and individual consultation with fashion competence and logistic know-how, the group goes far beyond simply supplying its customers with textiles. This is based on an international orientation, state-of-the-art technologies coupled with an understanding of the manifold needs of the customers.

The Group offers, for example, TotalCare, a fully managed service concept for personal protective equipment. The service modules can be individually combined with one other and offer customer the greatest possible degree of flexibility in clothing management. The superior design, durability and service provided by LHD Group around the globe has led to contracts with major agencies such as the Hong Kong Fire Services Department, Singapore Civil Defence, Brandweer Amsterdam, Hamburg Fire Department or the South Australian Metropolitan Fire Service, to name a few.

Particularly in the field of personal protective equipment, the group has set itself with its Lion brand the following goals and pursues them continuously:

Catering for the Growing Needs of Today's Firefighters

Firefighters around the world are exposed to the toughest conditions while on duty. During firefighting and rescue operations they experience varying environments and climatic conditions that impact them physically. In order to reduce fatigue, heat-stress and confinement issues as well as maximising durability and comfort, LHD Group has made its mission to develop PPE (Personal Protective Equipment) in a way to minimise the physiological constraints on the wearer.

Utilising state-of-the-art materials ensures that Lion garments are continually getting lighter while vastly improving their level of protection, breathability, durability and comfort. Of the multiple assemblies and composite constructions LHD has available to meet with the end user's requirements, the three-layer or two-layer construction, utilising spacer technology is one that LHD Group is specifically proud of. Through combining both the thermal and moisture barriers into a single composite, this technology reduces the overall weight of garment tremendously, therefore making it less bulky and improving overall movability. This patented innovation significantly revolutionises the way firefighting PPE is manufactured.

Optimising ergonomics is essential to enable first responder's freedom of movement. For this reason, the Lion garments are designed and produced to move in synergy with the firefighter's natural body movements. The raglan cut of the jacket allows the wearer to work overhead or in confined spaces without limiting the reach of the wearer – while at the same time preventing the hem of the coat rising up, thus minimising exposure. Together with the high-waist cut trousers, this ensures there is always sufficient overlapping of the jacket and pants. A lengthened sleeve and a thumb loop integrated into the cuff prevents the sleeve from slipping back to expose the hand and/or arm, provides optimum protection irrespective of the glove length.

The legs and arms of each garment are contoured to enhance natural movement and motion for the firefighter. Notched elbows and knees greatly reduce excess material from gathering behind these joints, providing greater freedom of movement while minimising wearer fatigue. The padded suspenders prevent compression when carrying personal equipment such as breathing apparatus and assist by carrying the weight of the trousers evenly across the shoulders.

Safety features are an essential for any suit to assist in situations requiring prevention or quick response. All Lion garments have an inspection portal enabling the assessment of the internal composition fabrics of each individual garment. This ensures that the garments are "ready for action" and offer sufficient protection. Should first responders find themselves in a volatile situation, Lion garments are available with integrated drag-rescue-devices (DRD), rescue loops and/or panic-zipper.

Creating innovations is essential to ensure LHD Group can always cater to the evolving needs of the first responder community. Apart from the spacer technology and the integrated rescue loop in our Lion garments, LHD invented the vented moisture barrier (VMB). The vented moisture barrier reduces the build-up of heat beneath the turnout coat by allowing air flow into the jacket – key in reducing heat stress while en-route to a call or while engaged in exterior firefighting operations. Furthermore, our Cooline suspenders actively reduce the temperature beneath the coat, helping to maintain the comfort level and further reducing heat stress. The TotalCare service offered by LHD Group around the globe is another innovation that speaks for the capabilities of the company; giving the customer the ability to choose service modules from design over laundry and inspection to disposal of garments. The TotalCare solution has proven to drastically prolong the durability of garments.

By incorporating all these features and services, LHD is able to provide a quality second to none in the PPE industry. The group's professional products, brands and services, as well as its transparency help to provide its customers with cost effective solutions. LHD Group works collaboratively with its customers to ensure the final product meets with their operational requirements while consistently exposing them to the latest in world class designs and global innovations.

For more information, go to www.lhd-group.com

CAFS Passes Tasmanian Coal Mine Test

Compressed air foam (CAF) is among the many suppression technologies in the fire service that is often met with both praise and doubt. With varying accounts of success and challenges, many fire service agencies are often unsure of embracing the technology. As a result, hands-on testing can be a way for individual fire service agencies to make decisions about how CAF can meet their fire suppression needs.

The Tasmania Fire Service (TFS) sought to determine the effectiveness of Class A compressed air foam for its fire suppression needs at the Hazelwood open cut coal mine in Tasmania. As part of the endeavour, firefighters conducted a brown coal batter test that encompassed an area approximately 10,000 square meters. The team tested ground temperature before and after the test to determine the cooling effect of CAFS, and monitored foam solution use to compare against typical water usage.

For approximately 75 minutes, the TFS delivered CAFS to completely extinguish the fire ground. Immediately following the application, firefighters tested the ground temperature, which measured between 120 degrees C and 150 degrees C. Before applying the compressed air foam, the ground temperature registered between 350 degrees C and 400 degrees C, displaying a dramatic drop in temperature following the CAF delivery.

Reports indicated that 45 minutes after the application, the ground temperature dropped to between 17 degrees C and 20 degrees C and offered no evidence of hotspots or re-ignition, according to thermal imaging testing methods. Overall, the compressed air foam offered fast suppression and cool-down traits at the testing site.

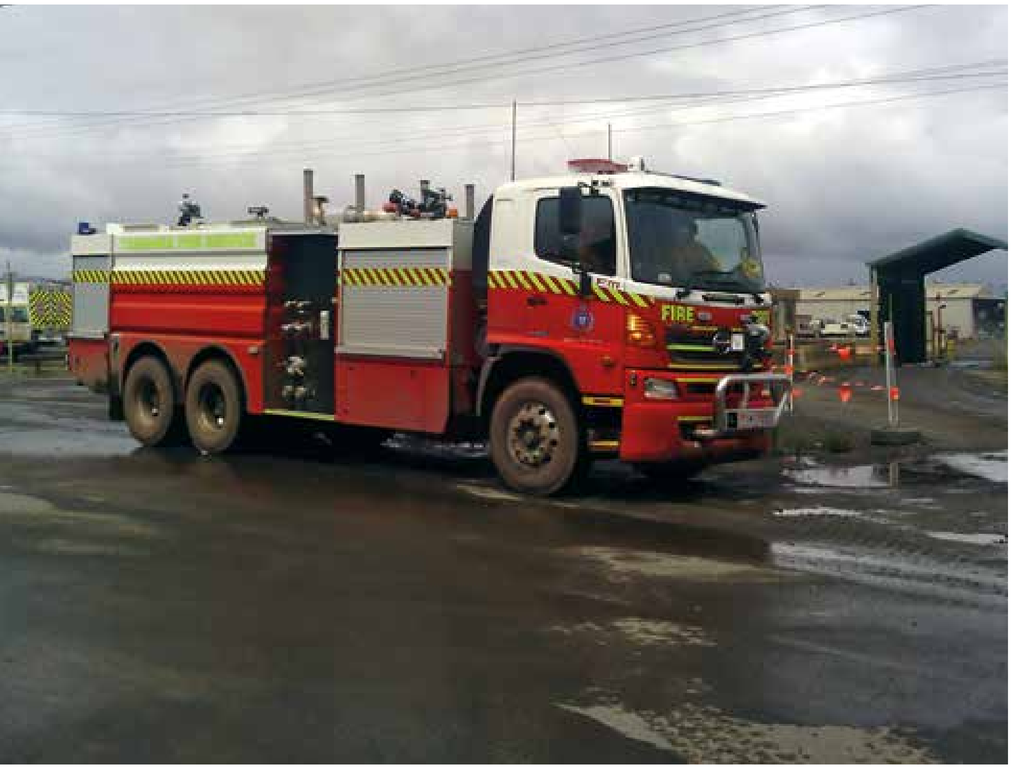
"The success of CAF at the Hazelwood open cut coal mine fire has led to a lot of interest in regard to the application and potential for CAF integration into urban and land management agencies within Australia," said Leon Smith, manager, engineering services with the Tasmania Fire Service.

When it came to water usage, the firefighters determined that the same duration of delivery with a similar flow rate would have consumed 337,500 litres of water, compared with the 40,000 litres of compressed air foam used in the test.

Following the testing, the TFS has been contacted by several agencies to provide information in regard to the specification and configuration of their appliance as well as the role that the team designed the appliance to undertake in the trials. "I have been asked to a forum that has been organized by the CFA (County Fire Authority) to discuss the trials, allowing them to consider this information relative to their risks and assist in their direction in regard to building a CAF capability," Smith said. "Other agencies are convening such groups to discuss and explore the same option."

Smith noted the exceptional extinguishing capabilities of CAFS as well as misconceptions surrounding the technology. "Many agencies have not previously embraced CAF capability due to a lack of easily accessible research and information pertaining to the medium as well as well engrained misconceptions about the issues and the technology," he said. "The opportunity to convey relevant, meaningful and accurate information to agencies will allow them to walk away fully informed and confident in their decision-making process in regard to CAF."

With this particular account of successful CAF testing, the TFS has embraced CAF technology and is spreading the word to its colleagues so individual fire service agencies can make educated, clear decisions about how CAF can be a useful tool for effective fire suppression. For the trials, the TFS used a Waterous CXVT 1250 GPM integrated cross-mount pump system and a Waterous foam injection system rated at 4750 litres-a-minute.



TFS CAFS Heavy Tanker –8,200 litres of water, 200 litres of Class A foam concentrate, Waterous pump set with foam injection system rated at 4750 litres-a-minute, 200 cfm compressor, and two FTF remote control monitors.

For more information, go to www.waterousco.com

When water is scarce and every drop of water is precious, the only practical option for fighting a fire is CAFS. According to US Fire Administration, it can take **15 gallons of water to match the effectiveness of a single gallon of ONE STEP™ CAFSystem foam**. This saves water without sacrificing results. When fighting a fire, everything counts – even water consumption – and only ONE STEP™ CAFSystem accounts for it all.

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Firefighting with Water Motor-Driven Foam Pump System

A water motor-driven foam pump system is a mechanical way of dosing foam concentrate and other firefighting additives into the water, without the need of external power or pressure balance.

There are mainly two different fundamental solutions to how to mix the foam concentrate into water flow:

■ Systems Using Pressure Balance Systems using this method are for ex. in-line inductor, balance pressure proportioner, bladder tank proportioner, and around-the-pump proportioner. These systems dose the foam concentrate mainly by achieving a pressure balance between water and foam concentrate.

■ Systems Measuring Water Flow vs Foam Flow. In this group there are mainly two systems:

1 Systems using electronically controlled flow meters for water and foam concentrate in conjunction with a variable output foam pump control system.

2 Systems using a mechanical solution with a water motor-driven foam pump. These systems consist of two volumetric parts, one water motor and one foam pump, connected to each other through a direct drive coupling. With this solution the water motor acts like a combined flow meter/drive for the foam pump, so automatically achieving the correct ratio between water motor and foam pump, without any external flow meters, foam pumps or orifices.

The water motor in this type of system may either be a turbine or a positive displacement type motor. The difference between these two options is that, with a turbine as drive, the flow and pressure range will be limited as a turbine (and Pelton wheel) is only partly volumetric.

With a positive displacement (= fully volumetric) water motor it is possible to maintain the mathematical ratio between water motor and foam pump in a wider pressure and flow range. FIREMIKS is such a fully volumetric system.

FIREMIKS can be used anywhere between a water source (hydrant or main water pump) and any type of nozzle (monitor, spray pipe, foam chamber, sprinkler head, low- ex, medium-ex or high-ex.) It does not need a pressure tank; only connect it to an atmospheric foam tank, which may well be the container from the foam liquid supplier. Furthermore it does not need any external energy.

Operating Principle

The water flow goes through the FIREMIKS water motor. This generates a circular rotor motion, transferred to the pump over the direct-drive coupling. The concentrate is pumped into the water motor outlet, where dosing occurs. (= Direct Injection Variable Pump Output Proportioning, NFPA 11)

Since the water motor and the pump are directly connected, the system is flow-proportional. Dosing is automatically adjusted from the amount of water that passes through the FIREMIKS. The water motor rotor has ten working wings, which gives an early and stable volumetric function of the water motor. The narrow interior design, along with low friction vanes, reduces noise level and creates long lasting durability.

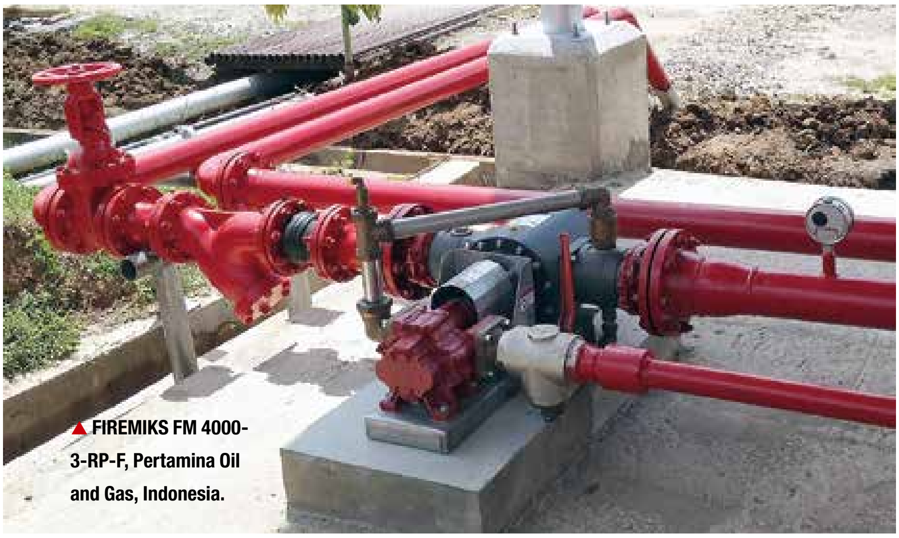
With FIREMIKS a fire brigade can lay out a system consisting of one FIREMIKS and for ex. Three, four or five nozzles working independently of each other, at different heights and lengths from main water pump.

FIREMIKS is offered in mainly three versions; fixed, mobile (both with gear foam pump) and sprinkler (with piston foam pump), High-pressure versions are available on request. Suitable markets are industry, fire brigades, sprinkler, offshore/shipping, forest firefighting. FIREMIKS is available in different flow sizes, from capacity 300 litres-a-minute to 12,000 litres-a-minute, and with dosing alternatives 0.5%, 1%, 2%, 3% and 6% as standard. Other options are available on request, including units with selectable dosing rates.

Due to its comparable low weight and compact design and no need of external energy, installation of a FIREMIKS is relatively easy. It can, if requested, be supplied with a dosing return valve enabling regular tests without consuming any foam liquids, an economical and environmental-friendly option. FIREMIKS meets applicable parts of NFPA 11 and NFPA 1901 and production is made according to European directive 2006/42/EC. Third-party inspection reports from DNV, Bureau Veritas are available.

Some reference examples are Pertamina, Indonesia, Oliver Tham Airport, South Africa, Jotun A/S, Norway, British Petroleum, Mozambique, Singapore Marin, Singapore, Nynas Petroleum AB, Sweden.

For more information, go to www.firemiks.com



▲ **FIREMIKS FM 4000-3-RP-F, Pertamina Oil and Gas, Indonesia.**

Image courtesy of Firemiks

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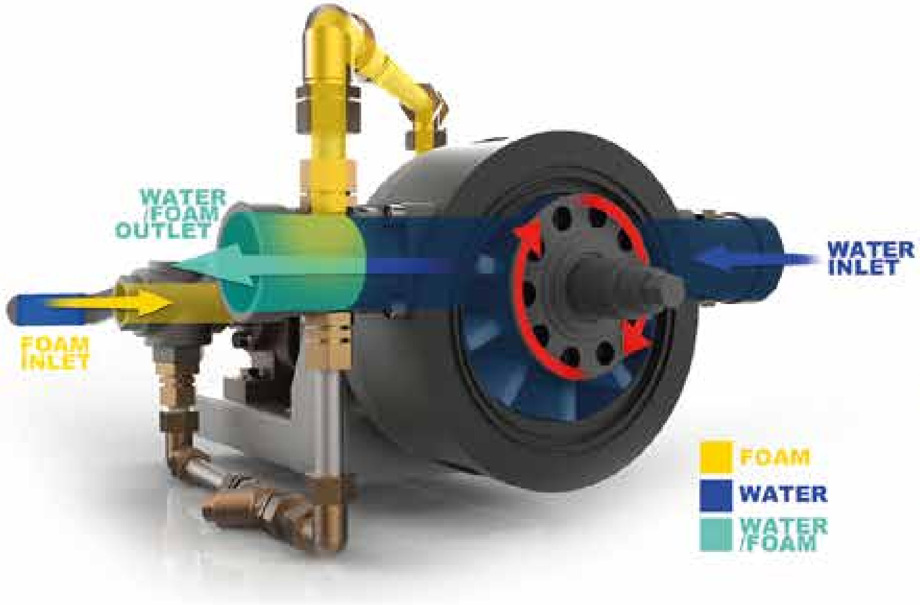
EASY TO USE

- Self-regulating flow system, no need for pressure balance.

ECONOMICAL

- Possible to test without consuming foam concentrate.



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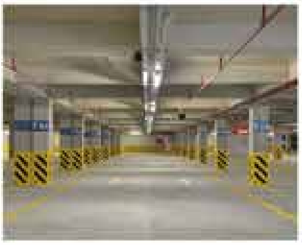
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Learning from Adversity at Key Industry Conference

Nearly 1100 emergency services representatives and researchers converged on Wellington, New Zealand in early September 2014 the annual AFAC and Bushfire and Natural Hazards Cooperative Research Centre conference. The conference is the leading knowledge sharing event for fire, land management and emergency services, with delegates attending from across Australia and New Zealand, as well as the US, UK, Korea and many Pacific Islands.

The theme for the conference was *After Disaster Strikes – Learning from Adversity*. Unfortunately there is no shortage of disasters from which to learn. The summer of 2013-2014 saw Australia experience some of its most extreme heatwaves. New Zealand is still coping with the devastating Canterbury earthquakes, while several Pacific neighbours are still recovering from cyclones and tsunami.

Natural and man-made disasters strike all countries, but particularly in our region, said AFAC CEO Stuart Ellis. "The conference was designed to bring together and share the combined wisdom of experience, research and analysis from across the sector to enable a deeper understanding of the approaches needed to secure the region's future and prosperity."

Bushfire and Natural Hazards CRC CEO, Dr Richard Thornton, said the conference showed why research and innovation are more important now than ever. "The week was a great opportunity for all emergency management practitioners to learn what we are discovering about the biggest challenges in emergency management across Australasia, especially learning from New Zealand's Canterbury earthquake experience, and finding ways to use this knowledge every day to make our communities safer."

2014 saw the Bushfire and Natural Hazards CRC partner with AFAC for the conference, taking over from its predecessor the Bushfire CRC. The research of the CRC was on show all week, but kicking off the conference on day one was the sold out Research Forum. The Forum showed why research and innovation are vital precursors for safer communities and better environmental management.

Close to 60 sessions were scheduled over days two and three, with leading experts sharing agency activities, research utilisation and case studies. The impact of disasters, sector capacity building and increasing resilience featured highly, with the program culminating in a closing panel on lessons learned. Panel members discussed opportunities for sharing work across boarders and the value of empowerment and mentoring to being a strong leader. The conference was capped off with four Professional Development sessions covering:

- An introduction to emergency management for those new to the sector.
- The Australasian Inter-agency Incident Management System (AIIMS).
- A mission command master-class.
- How to navigate emergency intelligence feeds.

Four field study tours also took place, and while it is now several months after the conference, there are plenty of resources available on both the AFAC and Bushfire and Natural Hazards CRC websites. These educational resources include audio and video of talks, abstracts, papers, presentations and research posters. They can be accessed at www.afac.com.au/events/proceedings.

Dr Thornton encourages all emergency and land management practitioners from across the Asia Pacific region to make use of the resources. "For those who could not make it to the conference, being able to access both the research information, and the latest developments from leading specialists within emergency management agencies, ensures that the benefits of the conference flow broadly."

This year the conference moves to Adelaide from the 1st to the 3rd of September, with the theme *New Directions in Emergency Management*. The approach to emergency management is rapidly evolving, and with it the need for better knowledge and understanding. Driven in part by the escalating cost and complexity of major incidents, the emphasis is shifting towards a holistic view that encompasses research, readiness, risk reduction, response and recovery. At the same time, emergency agencies are being comprehensively reformed to improve their effectiveness before, during and after a major event.

For more information, go to www.afac.com.au/conference

Asia Pacific Foam School: A Big Success

This past September, the Whyte Island Live Fire Campus of the Queensland Fire & Rescue Service in Lytton, Australia was once again the site of Solberg's annual firefighting foam fire school for the Asia Pacific region. As in past years, fire service and emergency response personnel from municipal and industrial brigades gathered to hone their firefighting skills and in some case for new department personnel their first exposure to large scale live fire scenarios involving firefighting foam.

The school curriculum included classroom and hands-on instruction to participants who attended from a variety of industries including aviation, chemical, oil and gas, mining, petrochemical, and state and territory fire and emergency services. Consultancy and engineering companies who specialise in fire protection, in addition to, government regulators were also in attendance.

The Whyte Island Academy of The Queensland Fire and Rescue Services puts Queensland at the forefront of fire training in the Southern Hemisphere. Incorporating an education centre, live fire campus, technical rescue cell and commercial training facilities, the academy offers world-class training to firefighters, other emergency service agencies, community and industry. The academy also contains advanced research facilities for the monitoring and analysing of fire behaviour and the testing of fire suppression materials and techniques, creating a safer working environment for firefighters and better protection for the Queensland community.

Besides the education centre, the three main features of the academy are the live fire training pad, the technical rescue cell, and the online campus, all offering Queensland firefighters world-class training, and assisting them in the delivery of an efficient, quality service. Industry groups can also benefit from training programs offered at the academy, minimising their risk of human, financial and environmental losses through the creation of safer working environments and improved levels of emergency preparedness.

Live fire course scenarios included a running fuel fire, process area fire, petrol tanker fire and an ethanol fire. A storage tank fire demonstration was discussed utilising video footage. The curriculum also included topics of discussion such as dry chemical powders, fuel types, fuel chemistry, environmental issues, global product certification test standards, regulatory issues, risk assessment and emergency planning.

Special guest speakers included Ted Schaefer, Senior Chemist R&D and Technical Manager for Solberg's Asia Pacific region spoke on technical developments and application techniques associated with RE-HEALING™ Foam and Nigel Holmes, Principal Advisor Incident Management Central Queensland, Incident Response Unit Environmental Services & Regulation, Queensland Department of Environment & Heritage Protection who spoke on "The Environmental Implications of Foam" with reference to the Queensland / Western Australia draft foam policy.

RE-HEALING foam concentrates from Solberg are an innovative, high fire performing environmentally sustainable fluorosurfactant and fluoropolymer-free firefighting foam used to effectively extinguish Class B fuels with no environmental concerns for persistence, bioaccumulation or toxic breakdown. RE-HEALING foam can be used with fresh, salt or brackish water and possess excellent burn back resistance due to its remarkable flow and rapid sealing characteristics.

Solberg RE-HEALING foam concentrates can be used to prevent re-ignition of a liquid spill and control hazardous vapours. The advanced firefighting foam was designed to replace traditional AFFF and AR-AFFF foam concentrates and older fluoroprotein foams. Concentrates are available in 1%, 3%, 6% and 3x6% ATC formulations and carry various product certifications and quality programs such as UL, FM, EN, ICAO and LASTFIRE.

The Foam School was a great opportunity to witness the performance of a variety of RE-HEALING foam concentrates. As well as hold question and answer sessions with factory personnel to further respond to industry questions and to educate fire service and emergency response personnel on fluorine-free foam technology

Based in Green Bay, Wisconsin with operations in Bergen, Norway and Sydney, Australia, Solberg has been involved with the manufacture of firefighting foams since the mid-1970s. Additionally, Solberg manufactures a complete range of traditional C6 compliant foam concentrates, Class A and High-Expansion foam concentrates including foam systems hardware.

Solberg's unique technology is preferred by customers in the aviation, chemical, energy, fire services, oil and gas, petrochemical, pharmaceutical, solvent and coatings markets.

For more information, go to www.solbergfoam.com

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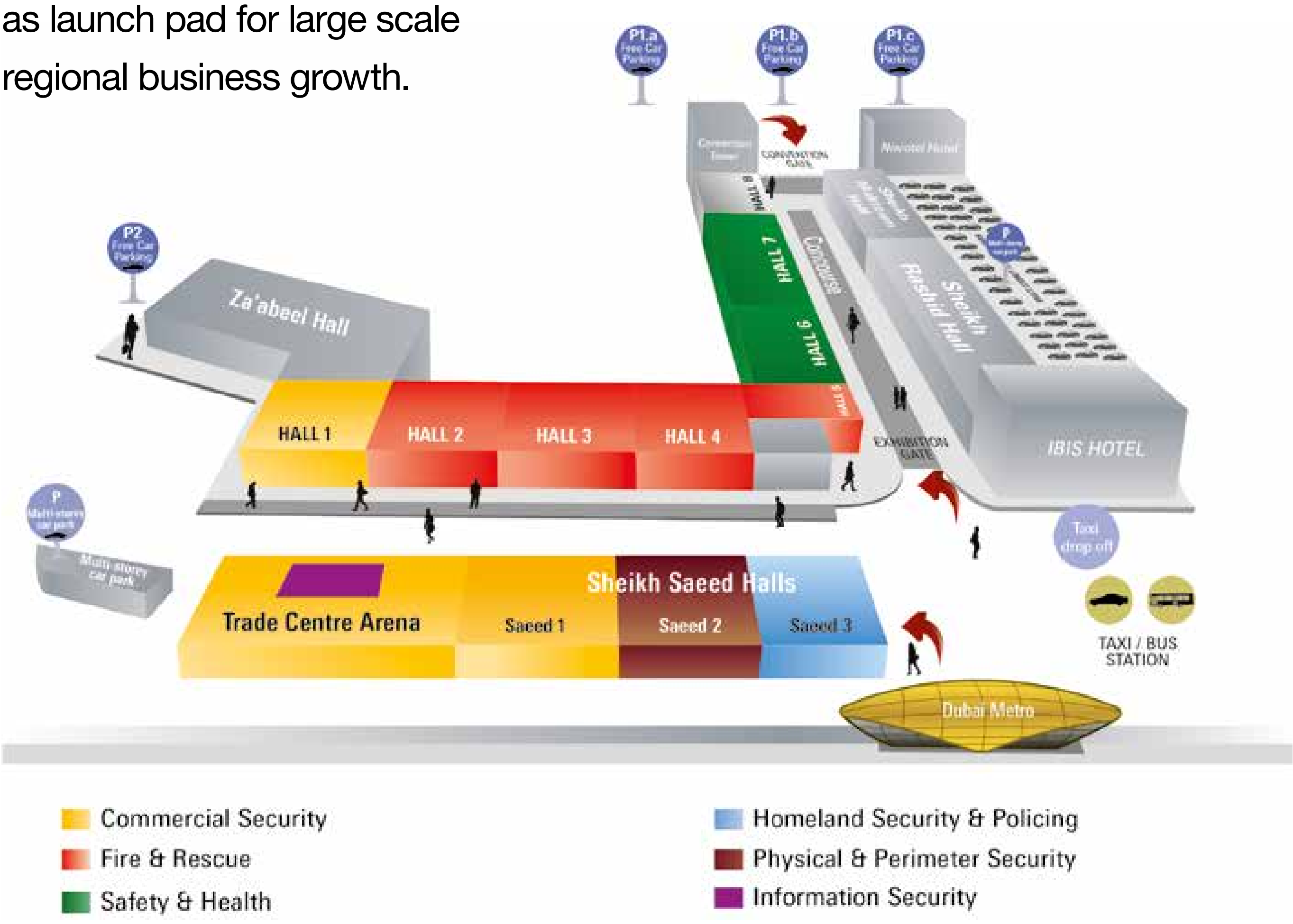

The upcoming Dubai Expo 2020 has sparked fresh impetus in the Gulf fire suppression market, as authorities look to secure critical infrastructure and protect the millions of expected visitors to the showpiece event. The Middle East region's first ever Expo is expected to attract more than 25 million people from around the world, while a price tag of at least US$9 billion suggests the host Emirate is pulling out all the stops to create state-of-the-art facilities and infrastructure.

The immense challenges that come with hosting such a major attraction mean the Middle East is expected to be hotbed of innovation from international players in fire protection, with more than 350 getting ready to showcase their latest products and services at the 17th edition of Intersec in Dubai. Prominent companies exhibiting at the three-day event, which takes place from 18-20 January 2015 at the Dubai International Convention and Exhibition Centre, are targeting large-scale business growth and increased opportunities, as a result of the Expo 2020.

The fire and protection section has recorded the largest percentage growth year-on-year at Intersec, largely due to UAE-based founding sponsor NAFFCO, which booked an entire hall for 2015. Other headline companies with a big presence include Honeywell, Hochiki, Eaton, Unisafe, UL, DuPont, Draeger, and Martech.

Hadi Al Khatib, CEO at Saudi-based SFFECO Global (Saudi Factory for Fire Equipment), and a regular exhibitor at Intersec, was among those confident that the growth in fire protection in the Gulf region will coincide with all other major industries. "The Dubai Expo 2020 is the confidence, or conformity, of growth in the region," said Al Khatib.

"If a country grows, then the people of the country grow, businesses grow, and there is growth everywhere. Of course safety and protection is a very vital part of this growth." He continued: "With the construction industry reaching for an upscale boom, it is very fair to say that the fire protection and safety industry will also be walking hand-in-hand with the overall boom. As the one-stop-shop for all firefighting and fire protection needs, SFFECO Global is prepared to cater and deliver products and services with cutting edge technology and high quality assurance for the growth resulting from the Expo 2020."

Organised by Epoc Messe Frankfurt, Intersec is the world's largest trade fair for security, safety and fire protection. Long-time exhibitor and fortune 500 company, Oshkosh Corporation, will use the event to launch its Global Striker 6x6 Airport Fire Fighting Truck. Bassam Munem, Senior Regional Manager of International Sales at Oshkosh Corporation, said: "The overall impact of the Dubai Expo 2020 on both the fire protection market, and our business, is going to be very significant. We expect an increase in government spending on infrastructure projects which reflect positively on Oshkosh growth."

While many Intersec 2015 exhibitors anticipate an influx of new business opportunities as a result of the Expo 2020, others are using the event to launch their latest product lines in a Middle East fire suppression market that, according to analysts Frost & Sullivan, will be worth US$1.1 billion in 2016. These include British company Spectrex, which manufactures hazardous area flame and gas detection equipment.

"At Intersec 2015, we will launch a new line of open-path gas detectors that will be released Q1-Q2 2015 that will have open-path capabilities of detecting H2S or Ammonia," said Jay Cooley, Vice President of Sales for Spectrex. He continued: "It is a common expectation and exposure and investments as a result of the 2020 Expo will increase business and development for all industries in Dubai and through-out the Middle East. This is also true for the fire protection market."

Ahmed Pauwels, CEO of Epoc Messe Frankfurt, said: "Large-scale international events coming up in the region not only create demand for stringent safety, security, and fire protection measures, but also drive fresh waves of innovation from the leading providers as they adapt their products to the ever-changing needs of today. "As the largest international safety and security platform serving the wider region, Intersec provides international manufacturers and suppliers unmatched networking and business development opportunities."

The 17th edition of Intersec will feature more than 1,300 exhibitors from over 50 countries and includes 13 country pavilions from Germany, UK, USA, Canada, China, Hong Kong, India, Italy, Korea, Pakistan, Singapore, Taiwan, and the UAE. Intersec 2015 will feature an enhanced line-up of conferences, seminars and workshops covering fire safety; information security; commercial security; technical textiles and non-woven safety clothing; occupational safety and safety design in buildings. The three-day event is the largest and most international trade fair of Messe Frankfurt's global network of security and safety exhibitions, which include: Secutech India, Secutech in Taiwan, Secutech Thailand, Intersec Buenos Aires, Secutech Vietnam and Seguriexpo Buenos Aires.

For more information, go to www.safety-security.messefrankfurt.com

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TEISEN offers the Super Line LDH with a diameter of up to 300mm. Super Line LDH is manufactured using a one-piece construction method, extruding the cover and lining in one step, with polyurethane through a polyester jacket.

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- ●Minimized pressure loss
- ●Compact storage through a new kind of rubber-like, polyurethane material
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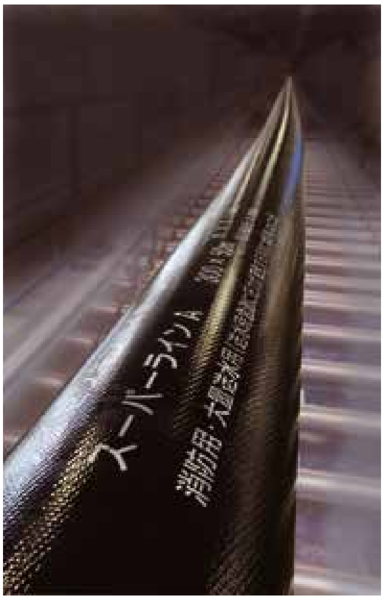
- ●Excellent resistance to heat, fuel, chemicals, UV, ozone, weathering, etc.



Diameter	mm	100	150	200	250	300
	inch	4.0	6.0	8.0	10.0	12.0
Color		orange	orange	orange	black	black
Wall thickness	mm	3.5	3.5	4.0	4.6	5.0
Weight	kg/m	1.1	1.6	2.8	4.0	4.8
Burst pressure	MPa	4.2	4.4	3.6	3.0	2.8
Maximum working pressure	MPa	1.6	1.6	1.4	1.4	1.4
Temperature range	℃	-20℃〜50℃				

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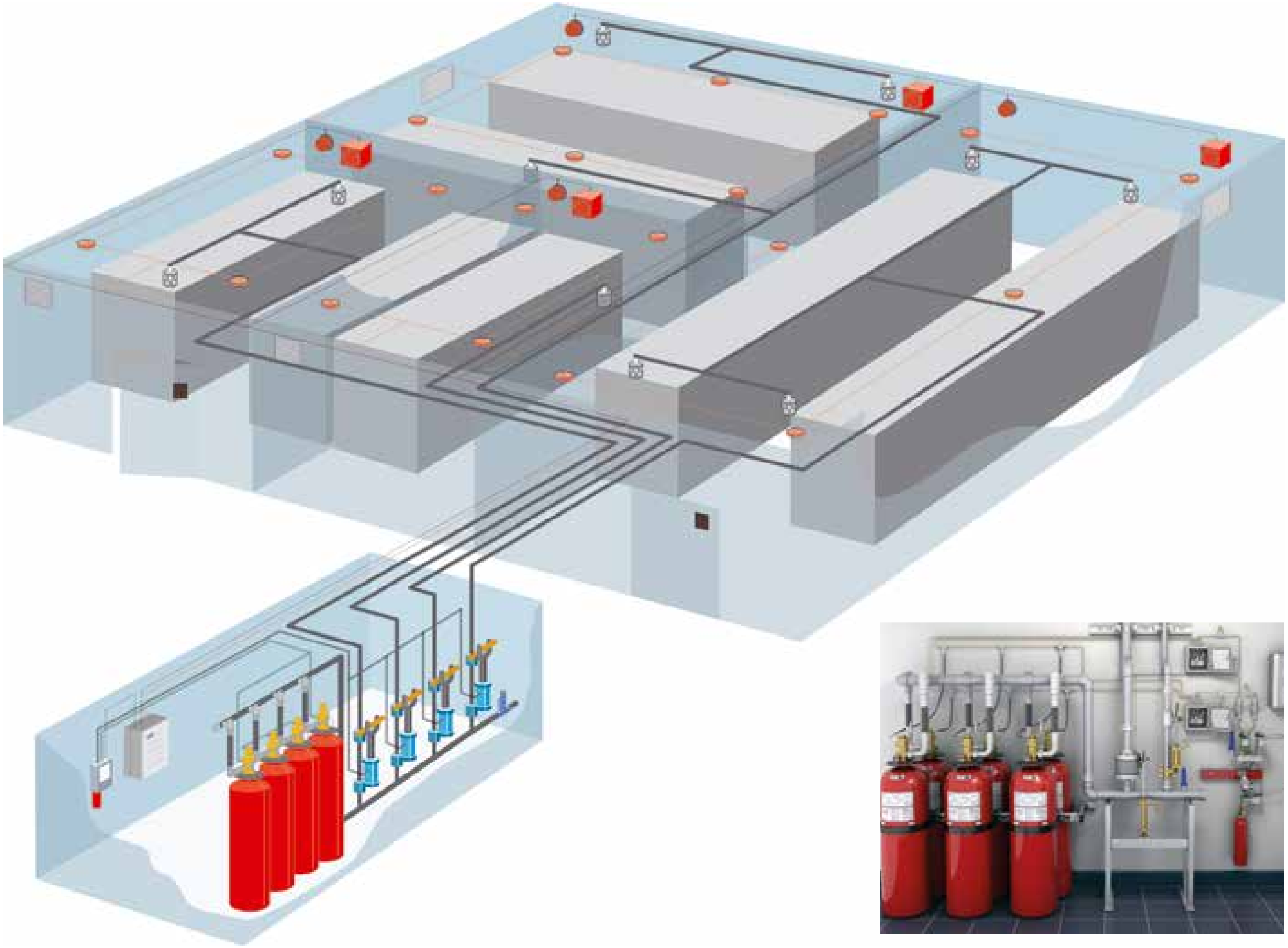
Multi-Zone Protection via High-Pressure Total Flooding

Imagine a clean agent fire suppression system that offers a high margin of safety suitable for both equipment and people; together with the ability to be discharged at a high pressure, offers the benefits of a cost effective implementation, as well as the ability to accommodate a wide variety of room configurations.



The VSN 1230 Multi-Zone System is a new high-pressure system developed by Viking GmbH & Co KG, part of the Minimax Viking Group. It utilizes 3M Novec 1230 Fire Protection Fluid that is able to be safely pressurised at 50 bar, a high pressure capability that is unique in the market and the key to optimised delivery.

The VSN 1230 system fully leverages the properties and superior flow characteristics of 3M Novec 1230 fluid, to create a cost effective, environmentally sustainable fire protection solution for valuable assets where continuity of operation is paramount.

Cost & Space Efficiency with a Multi-Zone System

Compared with standard 25 bar stand-alone systems, the VSN 1230 high-pressure 50 bar system enables the use of multi-zone capabilities to protect numerous areas within vicinity of up to 50 metres radius from one clean agent supply. A multi-zone system typically incorporates selector valves to automatically direct the agent to the needed area. This dramatically reduces the installation costs, as a multi-zone system requires only enough agent to protect the largest area, as opposed to the combined volume of all areas. There are also ongoing benefits for service and maintenance of multi-zone clean agent systems compared to standard systems.

Viking's 50 bar system can move

up to 75 percent more agent through the same size pipe and can run almost three times the pipe length compared to a 25 bar system in the maximum ten-second agent discharge time. Such superior characteristics allow for greater configurability of piping, such as being able to store the extinguishing agent outside the protected area; utilising longer pipe runs and even smaller pipe sizes. All these could result in more efficient use of space and cost savings.

Smaller Tanks, with Greater Piping Efficiency

Specially designed seamless tanks that can be safely pressurized at 50 bar are employed by Viking, and the economically optimised design ensures that the cylinder size optimises the ratio of agent to volume. A cylinder will contain both 3M Novec 1230 fluid as a suppression agent and nitrogen gas as a propellant. When pressurised to 50 bar, the nitrogen propellant occupies a lower volume, greatly increasing the usable space for the Novec 1230 agent. At the same time, the system enables the use of smaller tanks, achieving greater space efficiency in a cost effective manner.

Greater piping efficiency is also an advantage of a high-pressure system. A 50 bar system provides almost three times the available pressure than a 25 bar system, allowing longer pipe runs and ensures a homogeneous distribution of agent in the protected area. The high pressure compensates for friction losses in pipes, valves and hoses; ensuring a pressure drop would not affect the critical minimum nozzle discharge pressure.

Highest Margin of Safety in Market Enables Flexible Room Configurations

The margin of safety is the relative comparison of the design concentration of the agent with the no observable adverse effect level (NOAEL) of the agent. With a design concentration for Novec 1230 at 4.2 percent to 5.9 percent, and a NOAEL at 10 percent, the margin of safety could be calculated from the following formula:

Margin of Safety (%) =
(NOAEL ÷ Agent Concentration) – 1

Very often, the amount of agent used for a facility is calculated based on the empty structural volume. Space occupied by non-structural components such as equipment, electrical and mechanical fixtures and storage cabinets are usually not considered. The space occupied by non-structural components is difficult to determine and might be subject to changes over time. This might lead to the effective concentration of the agent being much higher than the intended design concentration. The risk of the effective concentration being higher than the NOAEL thus becomes apparent.

For example, consider an engine room using HFC227ea for class B fire protection. The design concentration is 8.7 percent and the NOAEL of the agent is 9 percent. Assuming that only 10 percent of the room volume is occupied by non-structural components, the effective concentration will increase from 8.7 percent to 9.7 percent using the following formula:

Effective Concentration % =
Designed Agent Concentration ÷
(1 – Non Structural Volume %)

As a result, the effective concentration for HFC227ea in the engine room is higher than the agent's NOAEL (refer to Fig. 1). If the given engine room is protected by 3M Novec 1230 fluid, the effective concentration will be 6.6 (Fig.1), leaving the room with a margin of safety at 52 percent. In fact, a system using 3M Novec 1230 fluid will enable to room to be occupied up to 41 percent by non-structural components before breaching its NOAEL at 10 percent.

Such characteristics of 3M Novec 1230 fluid enable it to be used in both large and small rooms without exceeding the NOAEL of the smallest room protected. In particular, the Viking 50 bar system leverages it to deliver multi-zone protection using the same cylinder of agent, reducing hardware cost and cylinder storage space.

SAFETY MARGIN OF THE DIFFERENT FIRE SUPPRESSION AGENTS (FIG 1)

Agent	Novec 1230	HFC-125	HFC-227ea	Inert Gas	CO2
Use Concentration[1]	4.5-5.9%	8.7-12.1%	6.7-8.7%	34.2-46%	30-75%
NOAEL[2]	10.00%	7.50%	9.00%	43.00%	<5%
Safety Margin	69-122%	-	3-34%	0-26%	Lethal @ design conc.

[1] Based on NFPA 2001 (2012 Edition) [2] No Observable Adverse Effect Level

A Safe & Sustainable Future with 3M Novec 1230 Fluid

3M Novec 1230 fluid has the greatest margin of safety when compared with other fire protection agents in the market, and is a highly efficient alternative to hydrofluorocarbons (HFCs) and Halon. The engineered fluid is stored in liquid form at ambient conditions but changes into a gas when discharged. 3M Novec fluid is non-conductive, non-corrosive, non-wet and leaves no residue, rendering it safe for protecting electronics, sensitive components, paper documents and other critical assets. Ease of shipping is also a key advantage, addressing refilling considerations even in remote locations.

It is also environmentally friendly – with zero ozone depletion potential, an atmospheric lifetime of five days and a global warming potential of less than one. The European Union and United States Environmental Protection Agency has recently introduced policies that indicate an eventual restriction in HFCs sold into fire suppressions. To assure customers, 3M Novec 1230 is covered by a Blue Sky warranty that assures that the agent will not be restricted in its use, for 20 years after original installation of an approved fire suppression system such as a VSN 1230 system.

For more information, go to www.3m.com and www.minimax-viking.com

VSN 1230 Fire Extinguishing Systems

Fighting Fire using Novec™ 1230 by 3M™

The extinguishing agent is particularly suitable for the protection of spaces with electronic and electrical equipment and offers an economical fire protection solution especially for small and medium-sized rooms. The 50 bar technology of the VSN 1230 system makes optimal use of the characteristics of this extinguishing agent.

Novec 1230 fluid has the best environmental properties, compared to other gaseous chemical extinguishing agents. It does not produce any hazard for the ozone layer and has a very low global warming effect. Within a mere five days, it dissipates completely.

There are many reasons for choosing a Viking VSN 1230 fire extinguishing system:

- Operating pressures up to 50 bar allow for more extensive pipework and storage of the extinguishing agent outside the protected area.
- Through cost-effective multi-zone systems, a single stock of extinguishing agent is sufficient to cover several zones.
- The Novec 1230 extinguishing agent is neither corrosive nor electrically conductive, leaves no residue and can easily be removed from the space in question through ventilation.
- The Novec 1230 extinguishing agent is also very suitable for zones that are frequented by people and has a very high environmental compatibility.

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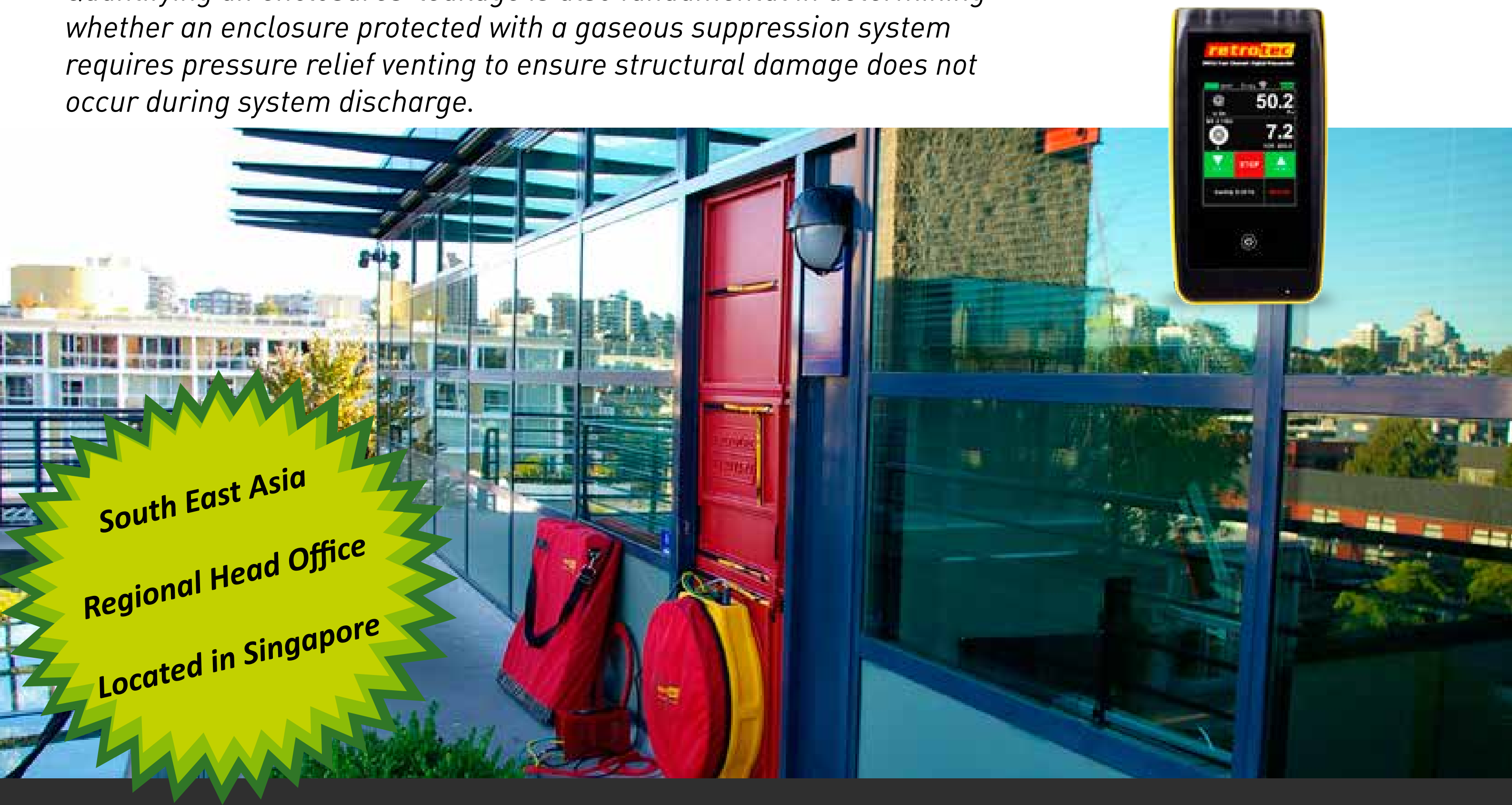
An Enclosure Integrity Test is a mandatory commissioning function for any gaseous extinguishing system that complies with ISO 14520, NFPA 2001, EN 15004 & AS ISO 14520. Confirming whether the enclosure that is being protected will maintain the suppression agent for a minimum duration of 10 minutes is a critical part of the overall system performance.

Quantifying an enclosures' leakage is also fundamental in determining whether an enclosure protected with a gaseous suppression system requires pressure relief venting to ensure structural damage does not occur during system discharge.



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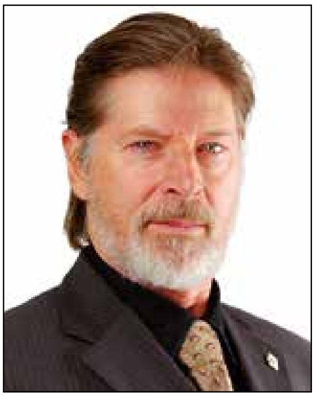
Clean Agent Enclosure Design

Clean agent fire suppression systems are used in enclosures where a sprinkler system could cause damage to sensitive contents, such as rooms containing computer servers, paper files or historical artefacts.



Colin Genge

President of Retrotec

Upon fire detection, the compressed clean agent, which can be a halocarbon or an inert gas, is released into the enclosure causing a peak pressure of around five to 25 pounds per square foot (240 – 1200 Pa) to occur for a fraction of a second. The magnitude is primarily dependent of the total enclosure leakage area.

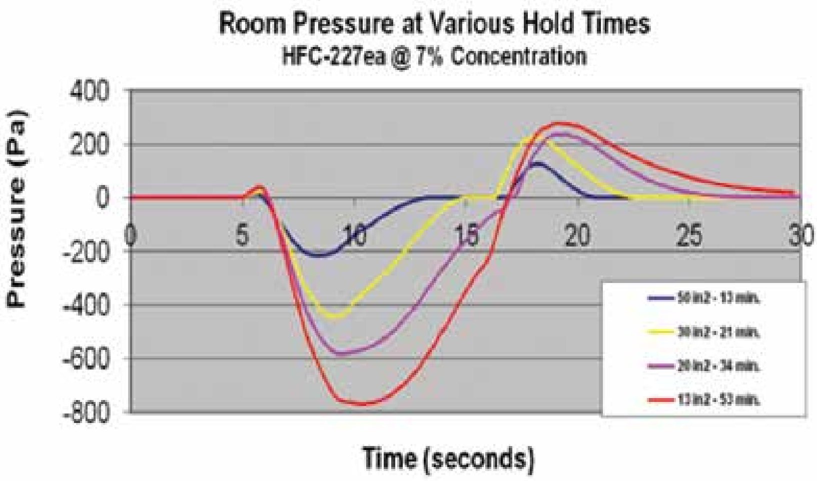
Once the enclosure is totally flooded, the agent will begin to leak out at a rate that primarily depends on leakage area in the lower part of the enclosure. The distribution of the remaining agent will either be constant throughout the enclosure (due to continual mixing) or will establish an interface with air above and agent below that descends over time as agent leaks from the enclosure. Until 1988, enclosures protected by clean agents used full discharge tests to determine the hold time. Since then, door fans have been used to measure the leakage area, which is entered into formulae found in Annex C of NFPA 2001 to predict the hold time.

Peak Pressure during Discharge

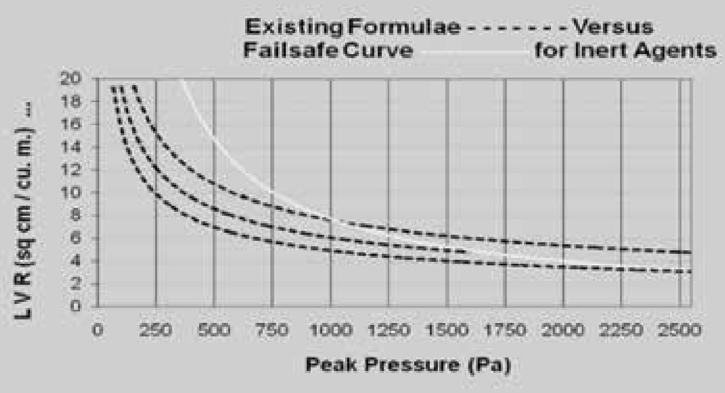
It is common practice for peak pressure calculations to be done for inert agents, but not for halocarbon agents. It will come as a surprise to designers that halocarbon gas discharges can produce as much peak pressure as inert agents, which is why NFPA now requires an evaluation of the maximum peak pressure be performed.

The magnitude of the peak pressure depends primarily upon the ratio between the leakage area of the enclosure and the volume of the room (LVR). In a typical halocarbon agent discharge, as shown in Figure 1, the peak pressure increases with enclosure tightness. This tightness also determines the hold times as shown in the legend. Although a peak pressure evaluation is required by NFPA 2001 Edition 2008 and later, the standard does not describe how it is to be calculated. Retrotec's software, for example, which can be used for hold time evaluations, provides the peak pressure calculation in its newest integrity software.

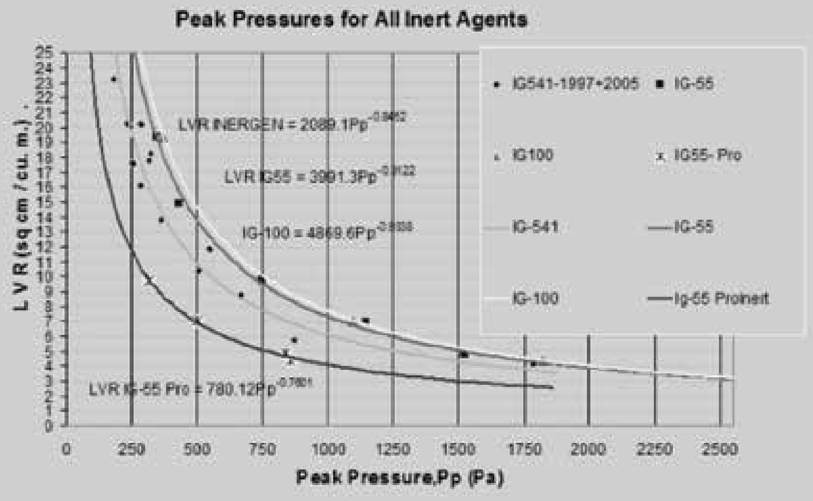
Typical halocarbon discharge (fig 1)



Peak Pressure is a function of LVR (Leakage to Volume Ratio) (fig 2)



Peak Pressure curves for all tested inert agents) (fig 3)



A five-year research project was carried out to provide a validated prediction model for peak pressure based on leak-to-volume ratio. This research uncovered many important facts about clean agent discharge pressures and the peak pressure formulae previously used to predict pressure values during enclosure design and testing. In particular, this research found that:

- Previously available inert agent formulae from equipment manufacturers typically under-predict peak pressure by a factor of two to four times.
- Under equivalent hold time conditions, halocarbon agents can produce as much peak pressure as inert agents.
- Peak negative pressures from halocarbons are strongly influenced by humidity and may be greater than positive peak pressure requiring Pressure Relief Vents (PRV) that operate in both directions.

Sufficient data was gathered to accurately predict the peak pressure for all agents. Figure 2 shows the new curve (in white) developed for inert agent peak pressure versus leakage to volume ratio (LVR). Previously-existing formulae (dashed lines) all under-predict the peak pressure expected at a given LVR over the typical peak pressure values from 250 Pa to 500 Pa. Figure 3 shows the results of testing of peak pressures versus LVR for all tested inert agents in the research.

Second Leakage Area Must Now be Measured

NFPA 2001 now requires a "specified enclosure pressure limit" that will, in turn, dictate the minimum allowable leakage area for the enclosure. This leakage area can be provided by accidental enclosure leakage, PRV or both.

The enclosure integrity procedure in Annex C of NFPA 2001-2012, has a new test method that provides leakage values for pressure relief and hold time. This measurement is now necessary to fulfil the new requirement in Section 5.1.2.2(10) that states: "an estimate of the maximum positive pressure and the maximum negative pressure" during the clean agent discharge must be made. Section 5.3.7 states: "If the developed pressures present a threat to the structural strength of the enclosure, venting shall be provided to prevent excessive pressures".

The designer can perform calculations using the new peak pressure equations that have come out of the research project to determine whether or not a pressure relief vent (PRV) is likely to be needed and alter the design using the approaches presented in this article. It is no longer sufficient to simply specify a PRV of a certain size; its leakage rate must also be measured after installation to confirm the vent both opens at the correct pressure and has a large enough free vent area to outdoors to prevent the peak pressure from exceeding the specified limit.

It is a common industry misconception that when a PRV is installed the problems are solved, but unless it is tested as installed there is no guarantee the PRV will work. Common and widespread problems are PRVs installed backwards for halocarbons where the maximum pressure is negative and blocked venting paths. Testing the PRV with a door fan will uncover these problems.

Optimising Peak Pressure and Hold Time Performance

Clean agent discharges can produce damaging enclosure pressures that increase as total enclosure leakage area decreases. Simply providing a lot of enclosure leakage area to solve the peak pressure problem creates another problem, because hold times decrease as the leakage area increases.

One solution is to add a PRV that will provide increased leakage to reduce the peak enclosure pressure; the enclosure can then be made tight to provide the specified hold time. An analysis must be

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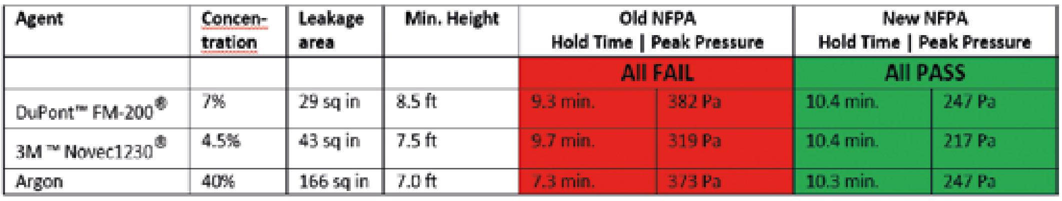
The new 2012 Edition test procedure (fig 4)



Agent	Concen-tration	Leakage area	Min. Height	Old NFPA Hold Time	Old NFPA Peak Pressure	New NFPA Hold Time	New NFPA Peak Pressure
				All FAIL		All PASS	
DuPont™ FM-200®	7%	29 sq in	8.5 ft	9.3 min.	382 Pa	10.4 min.	247 Pa
3M ™ Novec1230®	4.5%	43 sq in	7.5 ft	9.7 min.	319 Pa	10.4 min.	217 Pa
Argon	40%	166 sq in	7.0 ft	7.3 min.	373 Pa	10.3 min.	247 Pa

The new 2012 Edition test procedure provides a longer retention time and lower peak pressure than previous versions.

performed during the design stage where parameters such as total flooding height, agent type, discharge time, protected height can be manipulated to maximise protection and avoid having to make expensive last minutes changes such as adding agent or moving suspended ceilings or adding PRV.

Ironically, many inert agent protected enclosures have PRVs installed where they are not needed, while other enclosures (protected by both inert and halocarbon agents) need PRVs but they are not installed. This situation can be resolved by using the new enclosure integrity evaluation procedure along with the new peak pressure formulae so the installer will be given sufficient time to acquire the correct PRV for the job.

Selection of Specified Enclosure Pressure Limit

Formulae have been used for over a decade to predict peak pressures and to size PRVs for thousands of enclosures without damaging those enclosures. Since the research project showed that the actual peak pressures exceeded those predicted by the previously used formulae by at least 100 percent, and many of those enclosures were discharge tested with inert agents, it is safe to say that a wide range of enclosures handled 10 PSF (500 Pa) of peak pressure. One can therefore assume that a double-sided wall, securely fastened top and bottom, will easily handle 10 PSF (500 Pa). This can also be tested using a high pressure door fan.

While thicker walls can take more pressure as shown in Table 1, false ceilings can only take about 1 PSF (50Pa), requiring sufficient area of venting to protect them from damage.

Selection of an Appropriate Hold Time

NFPA 2001 requires a hold time of ten minutes or a time period to allow for response by trained personnel. However, ten minutes may not always be the appropriate hold time. The designer must consider what the response time for trained personnel is to determine if longer hold times are necessary. Shorter hold times might be appropriate for small enclosures that are always occupied. Reducing the hold time could solve one of the most costly and pernicious problems that installers face, where getting these enclosures tight enough to pass the ten-minute requirement becomes very difficult.

One of the most common mistakes made by designers is to overlook the fact that the agent will be mixed during the hold time. Mixing may often be the only way to pass enclosures where protection is required at high elevations in the enclosure. Knowing this in advance will allow for using 30 percent more agent than is usually needed to facilitate the continual mixing hold time extension.

Enclosure Design Approaches

The following design strategies have the potential to do one or more of the following:

- Reduce installation costs.
- Reduce the risk of damage created by discharge pressures.
- Ease maintenance.
- Improve fire protection.
- Reduce the risk of smoke damage.

These strategies are meant to be considered during the design phase. The installed performance of the PRVs must be checked during installation to determine that they open at the correct pressure, in the correct direction and that the free vent area of the entire vent path falls within the specification. A very different leakage test, with PRVs closed, is performed to check adequate retention time.

Wall Strength (fig 5)

Wall Type	Maximum Allowable Pressure (psf)
2x4 stud @ 16” OC	13
2x6 stud @ 16” OC	32
2x8 stud @ 16” OC	56
2x10 stud @ 16” OC	90
6” masonry reinforced	41
8” masonry reinforced	57
10” masonry reinforced	74
12” masonry reinforced	91
4” concrete reinforced	59
6” concrete reinforced	89
8” concrete reinforced	120
4” concrete unreinforced	29
6” concrete unreinforced	66
8” concrete unreinforced	117

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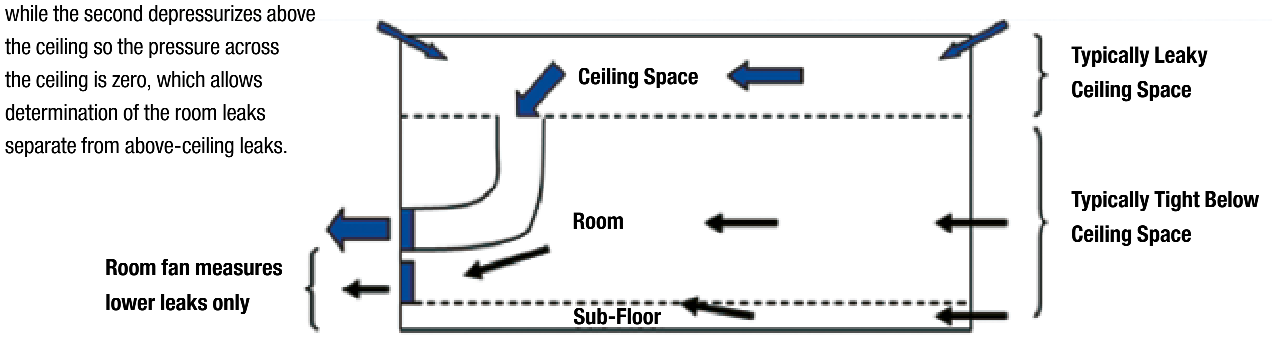
If a false ceiling is specified (fig 6)



One door fan depressurizes the room while the second depressurizes above the ceiling so the pressure across the ceiling is zero, which allows determination of the room leaks separate from above-ceiling leaks.

Ceiling Space
Room
Sub-Floor
Typically Leaky Ceiling Space
Typically Tight Below Ceiling Space
Room fan measures lower leaks only

- Seal the walls to the upper slab. Extending walls to the upper slab and sealing them is the only defence from fire and smoke entering from outside the enclosure. Paragraph C-1.2.1 (2) in NFPA 2001 states "…enclosures absent of any containing barriers above the false ceiling, are not within the scope of Annex C," meaning the enclosure will be difficult to test and verify.
- Flood the entire enclosure with agent. The higher the initially flooded height, the leakier the enclosure can be, producing less peak pressure but yielding longer hold times. Typically, the small savings generated by flooding only to the bottom of a false ceiling are offset by the increased air sealing costs needed for adequate hold time, and may also require PRVs more often.
  If a false ceiling is needed, nozzles should be specified above and below the false ceiling.
- Use an automatic door closing system. Doors often get wedged or propped open when the enclosure is in use. This practice impairs the clean agent system. A better solution is an automatic door release mechanism that will close the doors whenever the first alarm sounds. A mechanism should be specified that will close the door when it is de-energized so it is failsafe.
- If a false ceiling is specified, lower leaks should be sealed first until the specified hold time is reached and then leaks above the false ceiling should be sealed until the peak pressure limit is reached. The air leakage determination will require measuring upper and lower leaks separately, as described in Section C.2.7.2 of NFPA 2001 and shown in Figure 6.
- Increase the initial concentration of agent a further 15% over design concentration if continual mixing will occur, to ensure a long enough hold time. If air handlers continue to run during the hold time, then continual mixing is certain, but even equipment cooling fans or thermal effects can be sufficient to cause continual mixing. Increasing the margin between the initial and final concentration in the continual mixing case has the same effect as making the room taller in the descending interface case. For non-mixing cases, the agent is allowed to drain out until it hits the protected equipment, which is typically at 60 percent to 75 percent of the enclosure height, allowing 40 percent to 25 percent of the agent to run out before the equipment is no longer protected. If additional agent were not added, only 15 percent of the agent would have to be lost before the equipment loses its protection, since the standard requires that the final concentration at the end of the hold time at the top of the protected equipment be not less than 85 percent of the design concentration. NFPA 2001 uses an integration formula that increases the hold time prediction, but it is still important to add this additional agent, otherwise the enclosure will fail the hold time after only 15 percent of the total weight of agent is lost.

If no mixing will occur, the height of the protected equipment should be kept to a minimum. If the equipment height exceeds 75 percent of enclosure height, continual mixing may be the only way to achieve a reasonable retention time.

Pressure Relief Vents

If PRVs must be installed, there are several guidelines to follow to optimize their performance:

- Install vents as high as possible so that the lighter air is vented.
- Vents should open at pressures no lower than 2 PSF (100 Pa) so they do not open unintentionally under normal HVAC pressures and no higher than 3 PSF (150 Pa) so the pressure is vented early enough to prevent it from becoming excessive.
- Specify the correct direction for venting with the PRV. Inert agent discharges always create positive pressures and must have venting out of the enclosure, but halocarbons may create positive and/or negative pressures creating a need to be vented in either direction or both, depending on the agent and the humidity.
- All PRVs should be inspected annually to confirm they will open according to their specifications and to verify that the vent path to outdoors has not been accidently restricted.

Peak Pressure Evaluation

PRVs must be tested at a reference pressure of 2.6 PSF (125 Pa) in a temporary pressure box constructed around the damper or inside the tested enclosure. A large door fan flow will be required to test these vents in their open position. Dual acting PRVs open in both directions, so they must be tested in both directions.

For further information, go to www.retrotec.com

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PPE / PPC: The Last Line of Defence

In the world of modern fire and emergency services, there is an ever-increasing trend for firefighters to respond to more and different types of emergencies. With this trend, comes the commensurate need for effective and efficient Personal Protective Equipment (PPE).

Mark L. Gribble

International Standards Organisation (ISO) and Standards Australia representative for firefighting PPE

The International Standards Organisation (ISO) TC94 SC 14 is working through the issues of this PPE and is working towards an "ensemble" standard. That is a "head to toe" or holistic concept of protection. This allows for all of the items of PPE/PPC to be considered in the one standard.

By drafting standards in this holistic way, it better facilitates the notion of compatibility when considering the protection of the firefighter, rather than developing separate standards for each item of PPE/PPC in isolation. Working Group 1 (WG1) is charged to consider the issues of compatibility amongst many others. To that end it is critical to have a working knowledge of the ever changing dynamics of today's contemporary fire services and their responses, while considering the more historic and traditional emergency response agencies as well as the provision of emergency response in developing countries. End-user impute is paramount in this important consideration.

Many fire services across the world suffer from a narrow or singular focus on PPC acquisition. All too often the task of purchasing various elements of PPC or PPE is given to an upwardly mobile senior officer, with varying levels of understanding of PPC performance, and driven by ever increasing budget constraints. It may be that only one element of PPE is due for renewal in a given year. The following year a different person may be charged with the purchase of a different element of PPE. Clearly the issue of compatibility is of upmost importance, but often receives little consideration or does not form part of a holistic strategic long-term PPE plan.

Many countries have various types of staffing for a range of service delivery models. These may range from and or a combination of career, part-time or volunteer staff within government, military or private providers. All too often, the funding struggles to be spread in a balanced manor across all these models or within a given service. However it becomes particularly disturbing when PPE is purchased to a restricted budget, or cheaper lower level of protection for a larger numbered cohort of firefighters, just because the total initial cost is higher. If the firefighting risks and tasks are the same across these service delivery models, then the level of protection needs to be the same; for example, structural firefighting.

Some countries even have different levels of protection in their structural firefighting PPC on a given firefighter. This practice is also fraught with danger. It creates a different level of flame and heat protection in the coat compared to the pants. I understand that some departments have a layered approach, where they build on the level of protection using the station uniform as part of the base protection and build the rest of the protection with the turn out coat and pants or even layered approach to the turn-out gear itself.

This makes it hard to guarantee that firefighters will always wear both levels, particularly in the hot summer months. It also creates another mixed ensemble dilemma where some departments have a moisture barrier in the coat and pants for protection against water ingress, chemicals, blood borne pathogens and yes, even heat and flame, but do not have the same level of protection in the boots or gloves.

In fact much of my work on the various ISO committees has focused on the very important issue of compatibility. It is important to have a comprehensive and working knowledge of all aspects of compatibility and the performance dynamics of firefighting PPC/PPE and the various service delivery models, in conjunction with the range of attack strategies and tactics, as well as various emergency management intervention protocols.

Compatibility

The following is an extract from one of my submissions that I will be tabling at the next ISO committee meeting.

> There are three main areas of consideration when determining issues of compatibility of PPE/PPC when it comes to forming protective safety standards:
>
> **1** The fire service's / government's policy on "time, weight and type" of incident response and their philosophy on emergency management, including their Training, Strategies and Tactics.
>
> **2** The compatibility of the performance of the PPE/PPC for a given work environment.
>
> **3** The functionality of the protection at the interface, where different elements of PPE/PPC meet.
>
> **1.1** It is important to consider the mixed staffing types of response, which provincial demographic areas sometimes receive. This mixed response level often comes with different levels of protection in their PPE/PPC. Therefore it is critical to separate the tasks of these firefighters, as their PPE/PPC is not compatible if they all work in the "hot zone" of an emergency incident. Modern and contemporary fire services use the tactical management tool of Hot, Warm and Cold zones to better manage and delineate exposure risks, not only in HazMat incidents but all emergency incidents. The Hot Zone could be described as the area or potential area of work by an emergency service worker, where there is the risk or potential risk of exposure to any hazard of the incident. This Hot Zone can impact on the community as well and therefore no one should be permitted in such an area, without the appropriate and compatible PPE/PPC. Any mixing of levels of protection in PPE/PPC within this area is dangerous and makes it impossible to conduct and record a credible Dynamic Risk Assessment by the Incident Commander/Controller.

Of equal if not greater importance is having a strong fire service philosophy on emergency management. Many departments have adopted a risk-based philosophy, which looks at saveable life, property and environment. This often focuses on firefighters delivering an acceptable level of risk in accordance with their experience, training and PPE on saveable life, property or environment. While on the other hand they will not commit any risk, on life, property or environment which is not saveable.

Some others still pursue a higher risk attack strategy of intervention if it is at all possible, while others may adopt an entirely defensive strategy often due to longer response times or a lack of appropriate or compatible PPE/PPC.

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2.1 The compatibility of the performance of the PPE/PPC for a given work environment, is critical because any firefighter working in the same hostile, or potentially hostile environment, must have the same level of protection from their PPE/PPC. Again any mixing of levels of protection in PPE/PPC within this area, either on a given firefighter or between different firefighters is dangerous and makes it impossible to conduct and record a credible dynamic risk assessment by the incident commander/controller.

Transitional arrangements when changing from one supplier or issuing of PPE/PPC to another, often have subtle differences in components, sizing or design, any of which may have significant differences in performance, and therefore may not be compatible with the older PPE/PPC. This problem is often exacerbated when fire services transition to new PPE/PPC on an "as needs basis" for replacement, rather than a full replacement done all at the same time. Both of these circumstances have adverse impacts of the issue of compatibility and therefore safety.

3.1 The functionality of the protection at the interface areas of the body, is where different elements of PPE/PPC meet, and is also very critical in terms of compatibility, as it may expose some areas on the anatomy of a firefighter buy not maintaining an overlap of protection by way of poor sizing or incompatible design. Protection must be maintained through a wide range of movement and be catered for in the ergonomic design and appropriate anthropometrical sizing of the PPE/PPC.

When pursuing an ensemble standard it is important that all items of PPE/PPC can continue to provide protection and be fit for purpose when challenged from a given hostile environment or exposure and allow the firefighter the very best chance to escape to fresh air and or a safe area. By way of just one example, that being for a structural firefighting ensemble, this would mean that the helmet must be compatible with the collar of the turn-out coat, the communications system, the fire hood, and the B/A, and its functional components need to be used with a gloved hand.

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The coat must be compatible with the pants and perform the same as the pants and overlap to maintain the same level of performance. There may be an option of a layered approach to achieve protection in conjunction with the station uniform, if the wearing of the station uniform can be guaranteed on every occasion. It is for the last reason that I am not an advocate of a layered approach.

So to do gloves have to be compatible with the interface of the coat sleeve, and indeed all associated PPE/PPC and provide not only protection but also dexterity with a gloved hand. If a firefighter cannot feel what they are doing and cannot work with an associated piece of equipment, then they are not compatible.

I appreciate the next step is testing some elements of these requirements in a consistent way, but I am confident that this can be done, particularly if we focus on the primary function of the item of PPE. Some of the tests may not be "pass/fail", but many can be done in conjunction with "best performing" data, such as the dexterity of gloves, and therefore providing the best compatibility with a gloved hand. So if the primary function of a structural firefighting glove is to protect from heat and flame, this can be consistently tested and be compatible with the coat. Many of the other compatibility issues can be achieved at the tender evaluation process and could use the performance data as well as a battery of ergonomic practical tests.

B/A needs to be compatible with communications and connections need to be compatible with ancillary equipment. Firefighting boots need to be compatible with the leg of the pants in term of performance, overlap and size.

So by way of summary, firefighters see compatibility is required in a number of aspects. It exists between PPE/PPC, components of PPE/PPC as listed in points two and three above. A few national standards across the world try to cater for different levels of protection within a given risk category (for example, structural firefighting). This defies the logic that a Standard is a "minimum safety standard" that you cannot go below, but you can certainly construct an ensemble to a single performance level, commensurate to the identified risk assessment matrix.

Some countries write their national standards as separate standards for each item of PPE. Others like the NFPA try to have inclusive ensemble standards. This enhances the focus on all elements of compatibility, providing "head to toe" compatible protection. While the structural firefighting PPC component of the ISO Standard currently has parts that cater for the various items of PPC/PPE, it is the intention to finish with a singular ensemble structural firefighting standard.

As you can imagine this is a large diverse task across so many countries with different opinions and positions. Additionally, for example, it can be problematic when it comes to testing protocols and regimes, when it comes to testing helmets compared to the tests required for material and clothing. So to for the testing equipment and methods required for the testing of boots compared to gloves and yet all have to provide the same level of heat and flame protection, chemical protection and water ingress and therefore tests for that.

So to achieve an ensemble standard, there needs to be a consistent level of protection for primary risk factors, such as heat and flame and others such as chemical, water ingress, and strength, while encouraging the appropriate tests for all the different items of PPC/PPE, so that they can withstand the exposure risks of the same hostile environment. This is why I have dedicated so much time and energy into the Manikin test as well as the Sweaty Torso test.

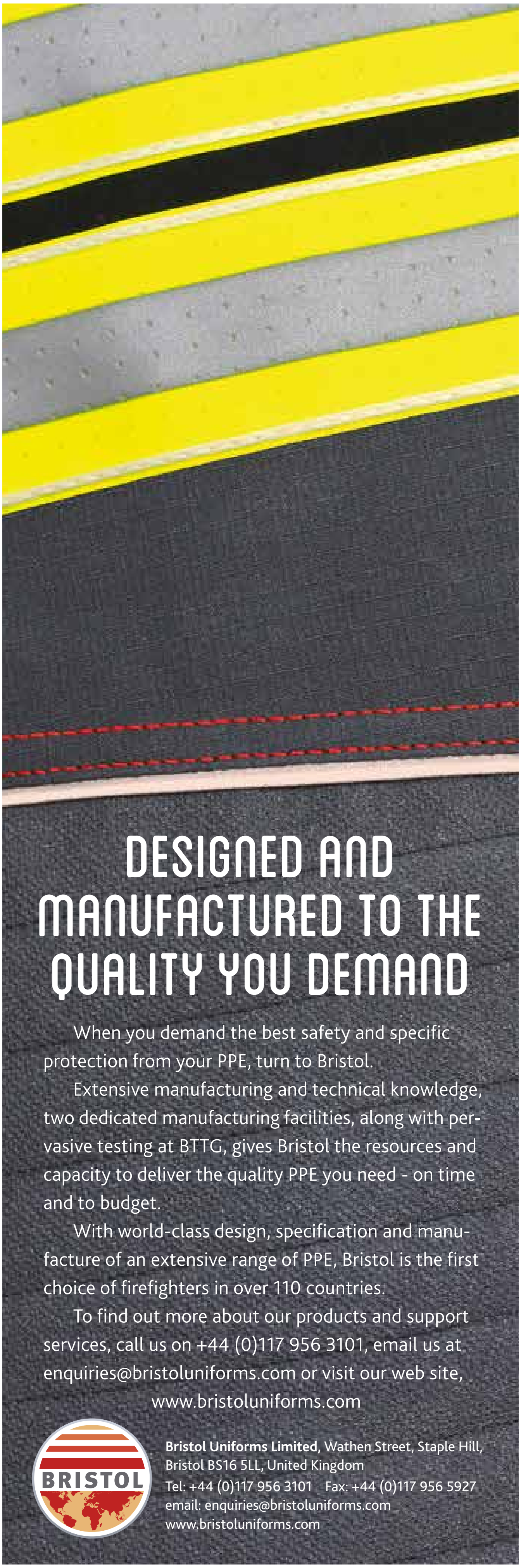
While the Manikin test is able to be conducted in about a dozen testing facilities around the world, there are still some variations in the results between them. As you may recall, we have undertaken a series of round robin "blind tests" (data comparison only) to exactly determine these variations. After researching a number of these facilities, often in conjunction with our ISO Meetings, I have provided a comprehensive list of the variations which exist, both in the Manikin-the data recording-room size-ventilation-burner intensity, angle and placement-as well as the different types and number of data collection nodes on the manikin.

These variations give rise to the potential for purchasers to "shop around" for the most desirable data set or outcome. In fact these variations across the world run the real risk of devaluing the very notion of Manikin testing. At the moment potential buyers of PPC test a range of options on a given manikin at a given test facility. This is of immense value when completing the whole testing regime, and in conjunction with the Sweaty Torso test, provides the purchaser a far more comprehensive and complete picture of the overall performance. At the moment the cables for the data collection from the Manikin, either come out of the head or the foot, thus restricting the ability to conduct a "full ensemble" test which could include helmet, fire hoods, coat, pants, gloves, boots, B/A, communication etc. However I am optimistic that a wireless manikin is not far away.

Therefore if we are able to get consensus on harmonising the required and associated PPE/PPC into a single ensemble standard, this should see the end product, is a better and a more user friendly document, with all the items of PPE/PPC for a given fire service activity in the one standard, hence reducing the amount of cross referencing which plagues many standards. In addition if we provide a brief descriptor of the given test requirement, it will provide more meaning for the end-user, purchaser, manufacturer and testing house staff.

As manufacturers and trade delegates continue to seek single standards worldwide across a given industry, current national standards will be required to consider ISO standards when reviewing their national standards and in the absence of national standards they will be encouraged to adopt the ISO standard. This is why it is so important that we remain actively involved in the ISO standards work environment, as global trends move away from individual and different national standards to a more cohesive and singular international standards system.

For further information, email markgribble7@bigpond.com



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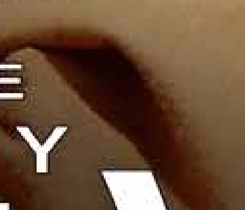


Reaching Communities in Disasters

Many countries are working concurrently on next generation systems to enable the public to contact the emergency services and, conversely, for the emergency services to alert the community to a life-threatening event. The time is ripe for international cooperation and innovation in developing not only the capabilities but also the required global standards.

Michael Hallowes

National Director,
Emergency Alert Program
at the Department of Justice,
Victoria

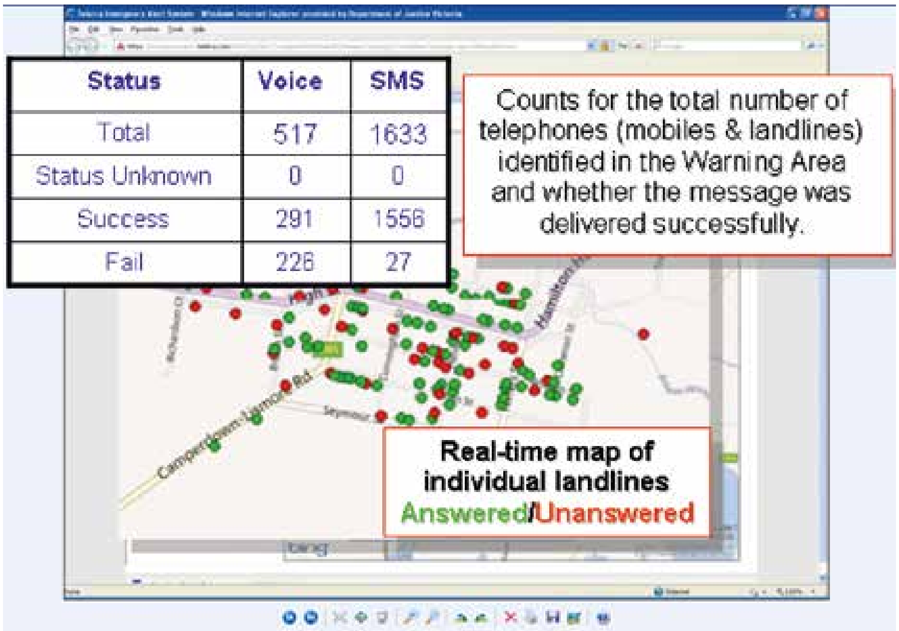
Australia has an annual "Disaster Season" that can impact on the community nation-wide. One of the worst was the "Black Saturday" bushfires in the State of Victoria in 2009. This caused the loss of 173 lives, destroyed 2,100 homes, displaced 7,652 people and burned 400,000 hectares. It also created the catalyst to develop a national telephony-based emergency warning system.

Funded by the Australian and Victorian State Governments, the Victorian Department of Justice has led two highly successful national projects to deliver an address-based and then a location-based telephone warning system, known as "Emergency Alert".(EA) To achieve this, Australia partnered contractually with its three national Mobile Network Operators, Telstra, Optus and Vodafone.

In October 2009, the Australian and Victorian Governments introduced the address-based function for EA. This customised system relies on the geo-coding of the service address for every mobile and landline registered in Australia.

When the emergency services need to send an address-based warning to a community at risk, the EA system matches automatically the map coordinates for the warning area with the geo-codes for every telephone registered within the zone. The system sends the alert as a text-to-voice message to landlines and a SMS to mobiles. The text-to-voice message is up to 4,000 characters, and the system sends these at the rate of 1,000 calls per min. The SMS is up to 160 characters, and the system sends these at the rate of 500 per sec.

In November 2012, Telstra introduced the location-based function for EA on its 2G and 3G mobile networks. In October 2013, Optus and Vodafone joined Telstra to create a fully integrated location-based



Status	Voice	SMS
Total	517	1633
Status Unknown	0	0
Success	291	1556
Fail	226	27

Counts for the total number of telephones (mobiles & landlines) identified in the Warning Area and whether the message was delivered successfully.

Real-time map of individual landlines Answered/Unanswered solution across Australia's three mobile network operators. In January 2014, Telstra launched a 4G location-based solution.

The system uses this new location-based functionality to identify every mobile with a last recorded location within the map coordinates of the warning area. The emergency services can then send the alert as a SMS to all the mobiles detected. The system sends these at up to 500 per sec. Should a need arise in future requiring a higher delivery rate of SMS per sec, then one option is to invite each Mobile Network Operator to increase the capacity of its Short Message Service Centre.

Emergency services access the system through a single desktop application that sends messages simultaneously to all landlines and mobiles on every network. The system can handle multiple concurrent warning campaigns.

The telephone alert is authenticated through the unique originating number, +61 444 444 444,

EA adheres to the three essential principles of an effective system for community warnings and information:

1. **Push** – emergency services push out to the community the first call to action to alert the public to the incident and to seek more information.
2. **Pull** – individuals, households, families, etc., then pull more information from the sources they have been advised to check, and
3. **Shared Responsibility** – emergency services provide sufficient information to enable the community to then make good and timely decision to stay safe.

Over five years of continuous improvements to the system, emergency services across Australia have used EA almost 1,300 times to send close to 11 million warnings.

The location-based solution has a successful delivery rate of 93%. The other 7% tend to be devices, which are visible on the mobile networks but not configured to receive SMS.

The location-based solution uses the 3rd Generation Partnership Project global standards and technical specifications for SMS with which all handset manufacturers and network operators comply. This means that everyone in Australia can receive the alert without needing to opt in, register, or reconfigure their handset. It is also free to the public.

This world-first capability means EA can reach people at home and when travelling. It is also available equally to visitors roaming on Australia's mobile networks. The only way to opt out of the service is to switch off your phone.

In April 2014, Australian Governments established the EA Program within Emergency Management Victoria, in the Department of Justice, I have been appointed as the National Director. My role is to lead the development of a sustainable service for the long-term that keeps pace with customer preferences and consumer behaviours as well as next generation technologies.

I am a passionate advocate of combining "people, process and technology" into the systems that help emergency services increase public safety. I spoke about this at the Asia-Pacific Economic Cooperation Telecommunications and Information Working Group in Brisbane in September 2014. The Australian Government Department of Communications hosted the event and used the Emergency Services Roundtable to promote an action plan amongst APEC member economies. The objective is to develop collaboratively the next generation of public safety communications systems. These will enable the public to contact the emergency services and the emergency services to reach the community.

A critical step in this cooperative initiative is collaboration on the global standards needed to ensure everyone gets the benefits of these capabilities. The learning from Australia's EA system is that overseas visitors must be included when they roam on the host nation's networks.

To do this requires international agreement on standards that ensure compliance by every handset manufacturer and network operator. This approach minimises the need for national regulation and ensures a fully inclusive public safety service. It also makes sure that no mobile device needs separate re-configuration by the user each time they visit a different country.

Australia's EA Program has looked at alternative approaches to public alerting systems. As Neil Bibby highlighted in his November 2014 article in the Asia-Pacific Fire Magazine, "It is not all about tweeting", it is not sufficient for emergency services to "broadcast" a Tweet and assume that doing so discharges a duty to warn the whole community. Unless you subscribe to social media and know which channels to follow as you travel, the emergency services can exclude you from the public safety benefits enjoyed by those who do.

Similarly, while some countries use alternative mobile alerting systems, such as Cell Broadcast, these are not fully inclusive of the population and international visitors. This is because such systems require customised configuration of the national network and handsets sold on the local market. This excludes overseas visitors and those with other specification devices.

In addition, only EA provides the benefits of real-time monitoring. This in-built functionality enables the operator to know that their message is actually reaching the targeted community.

With EA, we can see on-screen in real-time how many users are within the warning area and then what proportion received the message. For an evacuation, we can check the system to see how many mobiles left the area since the alert went out. This real-time monitoring can also show the operator whether the hazard, has already damaged the telephone infrastructure. Post-event, the emergency service can access relevant metadata stored by the Mobile Network Operators to identify whether a specific devices received the message.

This performance monitoring, audit and accountability gives the community and emergency services enormous confidence in the system during a campaign and in any post-event reviews.

Through EA, Australia can demonstrate what can be achieved in learning from disasters. Today, we can push critical warning messages out to help communities affected by emergencies to make good and timely decisions about their safety. EA provides a lasting legacy to the memory of the 173 lives lost on "Black Saturday".

We now want to work with our emergency service partners and the telecommunications industry around the world to build together the next generation of essential public safety systems. In particular, to share our experience and knowledge to inform global standards that will ensure inclusive access to these systems for everyone.

For further information, go to www.emergencyalert.gov.au

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Detector Options for Down-stream System Performance

Choosing a fire detection solution is not as simple as it used to be. Of course, if the base price is all you are focussed on and you need nothing more than a system to sound an alarm, then there are plenty of choices, but buyer beware, not all simple systems are the same, or in the end remain good value.

Richard Hitchman

Managing Director of Fusion Advanced, the Australian partner of global fire systems manufacturer Advanced

The cheapest system may still cost you more in the end, due to higher labour costs, poor quality and repeated nuisance alarms. Just one return trip to a site to solve a simple problem could cost more than the initial saving.

As fire, safety and living standards around the world improve and building technologies change, so the fire detection system needs to keep pace. The overall objective of any system is to protect people and assets and in order to do this effectively; systems need to interface with the building and its technology. More and more is being asked of detection and alarm systems.

Detection Options

When designing a system, the choice of the correct detection principle and technology is always a first step. We often see designs with very little thought put in up-front and it causes only compromises and problems downstream. In some cases, bad detection choice can lead to a breach in compliance to standards. A modern fire system will often cover multiple buildings and environments and needs to work with a range of detection principles from optical smoke point detectors to beam and aspirating systems, thermal, multi-sensors and flame detectors. A large system will often have a mix of detection from a short list of common contenders.

Point Detection

The most common choices are point detectors and these work very well in most installations. The high performance devices are addressable. They are usually installed easily and offer many detection options, the most common being optical smoke and multi-sensor (combined heat and optical smoke) but also include CO and even flame detection. Optical smoke and multi-detectors are the mainstay of any fire system and cover most environments. Devices can be wireless or wired, be supplied with integrated isolators, beacons and sounders or of modular construction allowing a combination of detection, sounder and beacon to be chosen.

Beam Detection

Where ceilings are very high and spaces wide and fitting a point detector would not comply with local standards, or where maintenance is difficult or impossible, beam detection is a good choice. Beam detection uses smoke obscuration of a beam of light (usually infrared) that bounces between a transmitter and a receiver or an integrated transmitter and receiver via a reflector.

Aspirating Detection

Aspirating detectors use an array of pipes with small holes that suck in air (and any smoke) from the environment to a (usually optical) specialist detector. They are highly sensitive and can be used in all manner of environments and configurations, but are often specified for high, wide spaces or hard to reach and service areas, such as basements and lift shafts. The pipes can provide detection while the detector can be located in an easily accessible space.

Flame Detectors

Flame detectors optically sense the flame through naturally dusty or obscured environments. They are often used in hazardous environments.

Performance Regardless of Detection Method

Modern detectors and the algorithms used in them, can supply all manner of options and benefits, but not considering how detector information can be used as part of a wider system can severely compromise overall performance.

Installing a simple smoke detector that cannot perform multi-stage warning with cause and effect logic, will often mean that the first you know of a potential problem is an alarm situation. However, if a device that has the ability to communicate potential problems early is used, then fires can be detected earlier, problems can be dealt with before they get out of hand, and cause and effect programing can put the building into an alert stage, initiating actions such as ventilation control.

In point detection, the next option could be whether to use a multi-criteria detector in place of a smoke detector. Again not all of these devices perform the same. Their big advantage is the ability to detect a broader spectrum of fires early and reduce false alarms. Better devices allow the sensing elements to be used independently and can use a combination to confirm a potential fire.

Assuming the fire system is sophisticated enough to utilise the various detection elements to trigger different cause and effect, many opportunities exist to maximise performance. A good example is in systems protecting large residential apartment complexes where alarms are frequent:

- A fully adjustable independent pre-alarm smoke threshold can be linked to cause effects. A high sensitivity can be used to activate a specific self-resetting local alarm to alert the occupant of a potential problem. This helps the occupant deal with the problem before it is escalated to an alarm condition.
- With the alarm threshold fully adjustable (within local standards), the cause and effect can be localised so that a second alarm tone is generated, notifying the occupant that the problem has escalated.
- In a high performance device, the point at which an alarm threshold is reached, allows a timed sequence of events to be activate the following possibilities:

    – A designated re-evaluation time period starts.
    – If the alarm has subsided after the time period has expired, then the system is reset automatically.
    – The option of a resample from the device at a higher sample/algorithm setting can determine if the situation has deteriorated.
    – An alarm acknowledgement (AlarmCalm) device can be utilised to enable the occupant to deal with the problem locally or signal that there is no obvious fire. This is a device that is mounted within the apartment and when the alarm is activated the occupant can press a button and obtain more time to deal with the problem, if he or she believes the alarm is not the result of a genuine fire. Once the button is pressed a further delay is activated and after the predetermined time period expires, the system will go into fire mode if the detector is still above the alarm threshold. If the signal has been cleared the system will reset.

- It is important to note that in any of the above conditions, the thermal element of the device is enhanced, so that even a small movement in temperature increase would generate an alarm and override any other confirmation processes.
- Should the system go into an alarm condition then the local sounders would generate a different alarm tone to warn the occupant that there is a potential genuine alarm.
- If all time periods have elapsed and the sensing element is still indicating a positive signal then the alarm tone would switch to an evacuation tone.

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- In an alarm condition it should be possible to activate the warning system in another tenant's premises, so that they are aware there is an alarm in the building.
- As there are multiple tones used in these scenarios, it is important to have synchronised sounders to ensure there is no confusion of tone types.
- It should also be possible to incorporate the cause and effect into any mass evacuation system or public address warning system.

Communications

As systems become more complex, the communication between system components becomes more crucial. Time is of the essence and systems can no longer wait to be interrogated on a polling basis. Detection devices need to be capable of monitoring their own environment and alert other components immediately of a status change. Fast accurate information is the key to ensuring the correct decisions are made quickly. It is no longer acceptable for systems to take many minutes to respond to events, when it is now possible for systems to respond in less than three seconds no matter how large the system is.

Throughout the overall system, the dependence on a single point of reference for cause and effect should be reduced. Distributed decision making is crucial, so that the system can continue to operate even when parts of the system have been compromised. This is true peer to peer communications.

Short circuit cabling protection down to device level has long been available and in a life safety system the system should not be compromised by a single cable fault. Devices need to be operational at all times or for as long as possible to ensure the system can do what it was designed for. From a practical point of view, if problems occur with cabling during the life of a building, then these problems can be identified quickly if short circuit isolation protection is incorporated in every device i.e. the fire panel will identify where the problem is.

Refurbishment Options

Detection technology needs to embrace existing buildings, system upgrades and difficult site conditions. Often the existing cabling infrastructure cannot be changed and in some cases new cabling cannot be installed. It is important to have a system that is flexible enough to cope with these situations without any compromise to performance.

Turning conventional systems into fully addressable systems without alterations to cabling – and delivering all the performance advantages of analogue detection discussed here – is no longer a problem and if cabling is not possible, then it is possible to do everything wirelessly.

Control

The heart of any fire detection system is the fire panel, which today interfaces with all kinds of critical and important building systems. The power of a modern analogue system adds pressure on detectors and detector choices. As the start of a cause and effect path, a detector that is appropriate and supplies detailed data is vital.

Cause and effect capabilities that are limited to purely the fire detection and warning system are a thing of the past. Fire systems now provide a direct link between detection signals and control ventilation systems, air pressurisation and smoke control systems, control fire doors, security, lighting and interface to building management systems.

As a life safety system it is important that the fire system is stand alone, but in many countries, the fire system needs to take overall control of these systems in a fire situation. The system needs to have the logic and interfaces to achieve this. Fire systems now need to be able to:

- Control extract and supply air systems.
- Monitor and react to external smoke ingress.
- Provide fire brigade controls to control the above.
- Offer graphical display and control of a site.
- Interface with BMS and other building control services.
- Provide multiple location control in real time (seconds not minutes).
- Offer building managers clear and concise operating terminals throughout a building with graphical displays and touch screen operation.
- Provide secure and dedicated paging services.
- Provide mass evacuations systems (public address or audio emergency warning systems), which are controllable from multiple locations.
- Provide distributed systems covering multiple sites.
- Offer web access for diagnostics and control.

So, as we can see, as our built environment becomes more complicated the choice of detection and the system that runs it becomes more important than ever. To offer real performance and more importantly protection a designer must understand both, not only in terms of standards and appropriate use but also detailed technical capabilities that can be carried right the way through a fire system and into the third party systems it integrates with. This is the power of the right detection choice; it leads to a choice of the right system and ultimately the right level of public and asset protection.

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Lighting the Way with Pelican Products

Today's firefighter is responsible for more equipment than ever before. Due to the burdensome amounts of gear required to do the job, anything that allows for lighter and smaller profiles would certainly be welcomed.

Scott Jones

Director of Product Management – Lighting at Pelican Products

One of the latest technological advances has entered into lighting tools, that being the transition from incandescent to the use of LEDs (light emitting diodes). LEDs have come a long way, transitioning from indicators to illuminators. We can all identify with the various uses of LEDs in our everyday life. It can be the little red light that shows your TV is on, the green light that tells you your computer is running or the blue light that reminds you your laundry is done. Today, we are seeing increased applications such as LEDs in traffic signals, tail lights of cars, trucks and buses as well as emergency lighting for fire, police and other emergency vehicles. These are all indicators.

There are many benefits that come with LEDs: they are not nearly as fragile as incandescent lamps, do not have a minimal life expectancy (some incandescent flashlight bulbs carry a life of 30 hours compared with 50,000 hours for many LEDs), and are more efficient with batteries and do not produce the high temperature levels seen with incandescent models.

With these added applications came a surge of attention by the LED manufacturers who have developed LEDs to go beyond being solely an indicator and become an illuminator. In the not too distant past the very first LED flashlights were small, amazingly bright keychain type lights (for an LED) that allowed for close-up uses like reading a document, lighting walk spaces, looking for keys in a purse or reading a menu in a romantically lit restaurant. The performance level achieved from LEDs used in personal lighting tools today have surpassed that of the previous versions and are looking to send the incandescent down the same path as the dinosaur and VCR. However, it is important to note that many of the legendary (incandescent) flashlight designs continue to serve a worthy purpose, as they maintain a price advantage over LEDs.

This technology has not only allowed

▲ Pelican Sabrelite™ Photoluminescent Flashlights in use by the fire fighters.

for performance increases of upwards of four to five times the lumens, but has brought with it the ability to create new categories in lighting tools. LEDs are bright enough now to be used in portable area lights, which offer solutions never before seen. Not only are the lights cool-running but very durable. Mixed with a self-contained rechargeable battery, they allow for the elimination of generators, which bring extra bulk, fuels, exhaust, noise, cables and heat concerns.

In addition to the ever-increasing light output, the technology has allowed for increased efficiency of LEDs, which brings longer run times. So we are now seeing increases in lumen output and at the same time, seeing longer run times. This was perceived as impossible in the past, but due to electronic drivers used in LEDs, it is now possible.

Another topic crucial to the fire fighter and rescue person is lighting safety approvals. Because there is the potential for responding to any number of scenarios, it becomes prudent to consider a safety-approved light. Due to the wide variety of environments there are a wide variety of approvals. All details regarding safety approvals are not covered in this article. Basics are provided and it is strongly recommended that further information be sought.

There are a variety of standards that exist and vary from country to country but we will use North America as a reference. Hazardous locations are categorised, following guidelines set down in the NEC (National Electric Code), by four criteria: Class – defines the nature of the potentially hazardous materials that are present; Division – classifies the likelihood of sufficient concentrations of the hazardous materials being present to pose a risk of fire or explosion; Group – categorises specific hazardous materials within each class by similarity of their properties or characteristics; and Ignition Temperature – hazardous materials according to the temperature at which they will ignite. One very good resource for a more in-depth explanation on safety approvals can be found at http://www.pelican.com/safety . There, you can review and download a safety approval white paper.

For some time, there has been a need to create a performance standard. In the past you may remember seeing flashlights reported in candlepower. This created a problem when trying to determine the performance as manufacturers were using a variety of different reporting methods and most end users were unaware of any candlepower rating system. Today flashlights are being reported in lumens, which is a measurable unit via a light sphere. The need for additional performance reporting such as run times, beam distance and water ingress, set the stage for a standard to be established.

So, in 2009 a variety of flashlight manufacturers collectively came together and created the first such standard, called the ANSI (American National Standards Institute) / NEMA (National Electrical Manufacturers Association) FL-1 standard. This standard covers a variety of performance areas, namely: light output, run time, beam distance, peak beam intensity, impact resistance and water resistance. There are icons used to reference each performance area and are identifiable by the ANSI FL 1 branding. This standard is adopted on a voluntary basis and is self regulated. It has proven to be of great value and can be referenced by any end user for consistent, reliable and comparable performance figures.

▲ Pelican 9410L LED Lantern in use by the fireman.

Lighting Options

There are multiple applications for flashlights in the fire and rescue workplace. Some of the more common types are head lights, hand held, right angle (hands-free) and lantern style lights. When selecting a light you should consider the size, weight and performance of each. Again, today the technological advances have allowed for smaller, lighter weight, yet higher performance lights.

Handheld lights come in variety of shapes and sizes but AA (typically three to four cells) and C (typically two to three cells) alkalines are the common battery of choice. There are a variety of switch

> **What is important is that the potential hazardous environment is evaluated to determine what, if any, approval is needed prior to entering and match that with the appropriate light.**

▲ **Pelican Remote Area Lighting Systems (RALS).**

designs to consider. Some are one-hand-activated where others require two hands to activate but typically will offer a higher level of water ingress protection. Another innovative feature is the use of photoluminescents (glow in the dark materials) that help locate an accidental loss of a light in the off position.

When considering a head light, it is best to avoid too heavy a light as it may put undue stress on your neck. An articulating head is beneficial because it allows the beam to be adjusted to the sought after angle. High beams and low beams are also a value as too much light in close up applications may be self-blinding and an unnecessary waste of battery life. Depending on preference and helmet style, a wide variety of straps and side attachments are available as the most common ways to secure it.

Lantern style lights typically are heavier and larger in size but have the ability to produce a brighter light beam and supply a longer run time. There are new model lantern style lights now available that are substantially lighter in weight (3 time lighter in some cases), yet produce industry leading lumen performance. A lantern style light should enable a better penetrating beam for smoke filled conditions, use in crawling situations and can be used to mark an egress location, identifying a safe exit.

Right-angle flashlights are designed to offer a hands-free application. Certainly, there are many times when two hands are needed. In these situations, you are able to keep a path illuminated while working with other equipment. Some of the latest designs in right-angle lights offer multiple features such as high/low beams, downcast and signalling. The high beam would be used for maximum illumination where the low beam would allow for a reasonable amount of light but extend the battery life. The downcast light is used to illuminate a path to minimise stepping into any unwanted areas, as well as used when reading or writing reports without a blinding effect. Signalling, also a benefit can be used in a variety of applications.

Another noteworthy feature you will now see on firefighter and rescue worker lights is battery level indication. Seeing how the lights used in our industry are truly “tools of the trade” and instruments we rely on, it makes sense to have some form of battery level indication. You will see some lights have an illuminated switch that supplies the battery level with varying degrees of colour. For example, green would represent 100 percent to 50 percent, amber would represent 50 percent to 25 percent and red would represent below 25 percent. Other designs will have multiple LED indicators that diminish with use. Still others offer a flashing signal to indicate a low battery level. Regardless of the type, battery level indication is of great value.

Beyond head lights, hand held, right-angle and lantern lights is area lighting. Area lighting systems of the past were powered by noisy, polluting, fuel-driven generators that emitted toxic fumes and heat, posing serious safety problems in emergency sites. A superior alternative is area lighting that offers users the ability to illuminate large work areas without the fuel consumption, noise and air pollution associated with industrial diesel generator-powered lighting towers of the past. Lighting up ravines, confined spaces or any other place your apparatus can’t go is made easy with the right area lighting system.

Now, more than ever, lighting products include increased options with improved performance and additional features, which makes it all the more critical to take extra care when choosing personal lighting tools. It could literally mean life or death for you and those you work to protect.

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Foam Suppression Systems – What You Need To Know

Whether it is protecting high-risk assets or an emergency situation, foam hardware has evolved since its commercial introduction in the 1950s to meet the needs of fire safety professionals, risk managers, fire service brigades, and industrial fire suppression for industries worldwide.

Jerry Borowski

Manager of Technical Services for The Solberg Company

Foam hardware components can generally be divided into four categories: tank systems; proportioning devices; discharge devices; and mobile equipment. The applications for foam hardware are governed by safety codes and standards usually under the direction of an authority having jurisdiction, for the intended purpose to prevent or mitigate the chance of costly property loss and business interruption, as well as reduction of risk.

Examples of such guidelines are National Fire Protection Association (NFPA) 11: *Standard for Low, Medium and High Expansion Foam; NFPA 16: Standard For The Installation of Foam-Water Sprinkler and Foam-Water Spray Systems; NFPA 25: Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems; NFPA 30 Flammable and Combustible Liquids Code; NFPA 409: Standard On Aircraft Hangars; NFPA 412: Standard For Evaluating Aircraft Rescue and Fire-Fighting Foam Equipment; NFPA 418: Standard For Heliports and EN13565-2: Fixed Fire Fighting Systems – Foam Systems Design, Construction and Maintenance* and FM Global Property Loss Prevention Data Sheets.

▲ Foam-Water Sprinkler System.

So what exactly is a foam system? NFPA Standard 11, Section 3.3.6 defines foam-water sprinkler systems as “a special system that is pre-connected to a source of foam concentrate and to a water supply. The system is equipped with appropriate discharge devices for extinguishing agent discharge and for distribution over the area to be protected. The piping system is connected to a water supply through a control valve that usually is actuated by operation of automatic detection equipment that is installed in the same area as the sprinklers. When the valve opens, water flows into the piping system, foam concentrate is injected into the water, and the resulting foam solution discharging through the discharge device generates and distributes foam. Upon exhaustion of the foam concentrate supply, water discharge follows and continues until shut off manually. Systems can be used for discharge of water first, followed by discharge of foam for a specified period, and then followed by water until manually shut off.”

Foam-water systems can take different forms like deluge, wet pipe, dry pipe, pre-action, spray and pre-primed systems depending on the type of risk requiring protection.

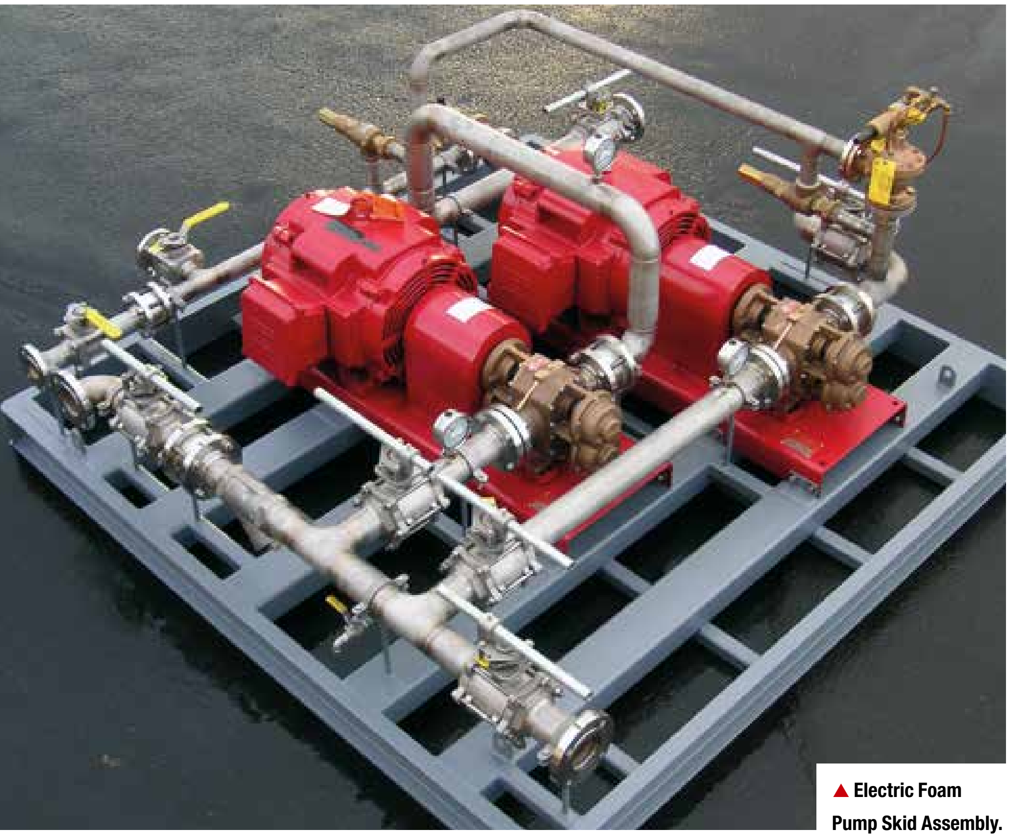
Fixed foam systems are designed to protect single and multiple high-hazard, high-risk applications and can utilise either Class A or B foam concentrate. In the case of Class B foam, there are various foam concentrate types with the most common being Aqueous Film Forming Foam (AFFF), Alcohol-Resistant Aqueous Film Forming Foam (AR-AFFF) and detergent (High-Expansion) based foam.

Foam Hardware Systems

■ Bladder Tank System

A Bladder tank is the main component in this type balanced pressure proportioning system. It requires no outside power source other than an adequate water supply. The bladder tank is a carbon steel pressure vessel with a nylon reinforced neoprene rubber bladder inside that stores the foam concentrate. During operation the foam concentrate is discharged from the tank by the water supply, collapsing the bladder around a perforated centre tube until the concentrate is depleted. Bladder tank systems include various component parts such as proportioners, discharge devices, swing check valves, ball valves and hydraulic actuating ball valves. Typical sizes tanks range from 189 litres to 12492 litres.

Most manufacturers of bladder tanks offer them in standard and pre-piped configurations, vertical and horizontal versions. Selection of any specific tank configuration is dependent on the available space where the installation is to occur. Two different types of proportioners can be used in bladder tank systems; they are a variable range proportioner or a conventional (between the flanges) proportioner. The variable range proportioner is used in a closed head foam-water sprinkler system where both a minimum litres-a-minute and maximum litres-a-minute flow is required. A conventional (between the flanges) proportioner is typically used in a deluge system where discharge devices such as foam chambers, foam makers, monitors or sprinkler heads are incorporated into the design.



▲ **Electric Foam Pump Skid Assembly.**

■ Positive Displacement Foam Pump System

Positive displacement foam pump skids are typically found in two different type systems they are: balanced pressure (BP) foam pump skids and in-line balanced pressure proportioner (ILBP) foam pump skids. Both systems use the same components such as an atmospheric tank, positive displacement foam pump (electric and diesel), balancing valve, and full service control panel (electric/diesel).

The main difference between an ILBP and the BP pump skid is that the BP pump skid utilises a conventional (between the flanges) proportioner located on the foam pump skid. Whereas, ILBP pumps skid allows the use of in-line balance pressure proportioner which can be remotely located away from the foam pump skid.

The Foam pump is primarily driven by three common power sources: electric motor, water motor (Pelton wheel) or diesel engine. Foam pumps are typically positive displacement rotary type to ensure that any viscosity foam concentrate can be used. Foam concentrate is typically supplied by an atmospheric storage tank.

■ Foam Concentrate Proportioning System

A foam concentrate proportioning system is a self-contained, preassembled proportioning system with a positive displacement water motor powered pump. These systems require no outside power source other than an adequate water supply. A foam concentrate proportioning system will also require the use of an atmospheric tank (contains the foam concentrate) and can be recharged without stopping the flow of the system.

The atmospheric storage tanks itself is typically manufactured of high-density, cross-linked polyethylene in a vertical configuration. Storage tank assemblies are equipped with a suction connection, return connection, drain/fill connection, and domed top. Typical sizes range from 18 litres to 37854 litres.

■ High Expansion Foam System

A high expansion foam system is designed for total flood or local application hazards and incorporates the same hardware components and devices as describe for bladder tank and proportioning foam systems. A high expansion foam generator is an air-aspirated discharge device that is typically water powered and requires no other outside power to deliver expanded foam solution in volumes ranging from 200:1 to 1000:1.

Proportioning Devices

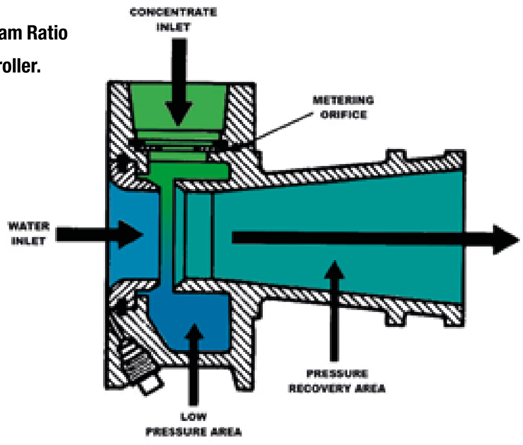
■ Foam Ratio Controller

Ratio controllers are a modified venturi device designed to meter the correct amount of foam concentrate into a water stream over a specified range of flow and pressure rates with minimal pressure loss. The ratio controller consists of three components: the body with water inlet, metering orifice located in the foam concentrate inlet, and throat (nozzle) located downstream from the water inlet.

■ Inline Balanced Pressure Proportioners

Inline balanced pressure (ILBP) proportioner are a complete self-contained device that incorporates the necessary components including ratio controller, duplex gauge, balancing valve, check valve, ball valve, and associated brass piping. ILBPs are designed to balance the incoming foam concentrate pressure with the incoming fire-water pressure, and meter the correct amount of foam concentrate to fire-water stream over a wide range of flow rates and pressures. The ILBP system works with a positive displacement foam pump, to supply foam concentrate to the ILBP. A pressure sustaining valve, located in the return line, carries excess foam concentrate not needed by the device back to the atmospheric storage tank.

▶ **Foam Ratio Controller.**



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Threaded Proportioner

Threaded proportioners are modified venturi ratio controllers that accurately mix and meter foam concentrate into fire-water streams. Each proportioner consists of the following components: body, inlet nozzle, and metering orifice constructed out of bronze material. During operation, water flows through the modified venturi to create an area of lower pressure which is directly affected by the water velocity as it flows through the ratio controller.

▶ Variable Range Proportioner.

Discharge Devices

Variable Range Proportioner

Variable range proportioner is a low foam solution proportioning device, designed to accurately proportion the foam concentrate into the water stream at both high and low system flow rates. The variable range proportioner is designed as an integral component of a bladder tank proportioning system, used with foam concentrates in foam-water sprinkler systems. Use of a variable range proportioner complies with NFPA 30, the flammable and combustible liquids code, Paragraph 16.5.1.6.2, which states "foam/water sprinkler systems are to provide foam solution to operating sprinklers with 4 sprinklers flowing."

Continuous Flow Hose Reel

Continuous flow hose reel assemblies are typically manufactured with magna-cast aluminium supports and brass waterway. Hose reels typically feature non-collapsible booster hose and brass 90-degree elbow inlet swivel with male NST outlet. The carbon steel reel is designed to store and deploy continuous flow hose, which allows liquid to flow while the hose is still on the reel. Hose reels are used for remote protection of assets or where manual foam firefighting is required.

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■ Foam Chamber

Foam chambers are NFPA-11 Type II air aspirating foam discharge devices that provide protection for open top floating and cone roof flammable liquid storage tanks. Foam chambers are a combination of a foam mixing chamber and a foam maker with an air inlet. A removable orifice plate is located between the flange inlet and solution pipe flange, and is sized to deliver the required foam solution at a specified pressure. A frangible vapour seal located in the foam chamber body prevents product vapours from entering the foam chamber body. The vapour seal will break once the foam solution enters, filling the foam chamber body with expanded foam. The foam flows to a deflector plate, which directs the foam to the inside of the storage tank wall and fuel surface, only allowing minimum foam submergence and fuel agitation.

■ Foam Maker

A Foam maker is a stainless steel discharge tube incorporates a mixing barrel, an orifice plate (sized for the required flow at a given pressure) and an air inlet to allow air into the foam solution stream to generate expanded foam. The foam maker is normally installed in the line of a semi-fixed or fixed foam fire protection system. Foam makers are air-aspirating foam discharge devices used primarily for the protection of the seal area of open top floating roof storage tanks and dike areas around storage tanks. Additional applications include protection of spill hazards and diked flammable liquid storage areas.

■ Foam Station

The Foam station is a quick knock down fixed hardware device. The unit is typically self-contained, consisting of stainless steel concentrate tank, eductor, hand-line nozzle and non-collapsible hose. When in operation, water is introduced from a dedicated water source through the supply hose to the educator. While water is passing through the eductor a vacuum is created, which draws foam concentrate out of the tank, up to the eductor and into the water stream, delivering the foam solution. Some foam stations may be as simple as connecting a monitor with self-educting foam-water nozzles to a hydrant with placement of a tote or drum of foam next to it.

▲ Remote Monitor with Self-Educting Foam Nozzle.

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■ High Back Pressure Foam Maker

High back pressure foam maker is a discharge tube (bronze, carbon steel or stainless steel) with flange inlets and outlets and has air induction holes placed 90 degrees apart to allow air into the foam solution stream to generate expanded foam. These special foam makers are to inject foam into a fuel storage tank at the base of the tank. The foam then floats to the surface of the tank to extinguish the fire.

Mobile Products

Mobile products are designed to provide quick, mobile foam fire protection for hazards consisting of flammable liquids. These types of hazards can be defined but not limited to tank farms, loading racks (both truck and rail), chemical processing plants, and marine loading terminals. Mobile products greatly increase the firefighting ability of emergency first responders. Mobile foam devices can be used with either Class A or Class B foam concentrates.

■ Foam Cart

A mobile foam cart is designed and constructed for one person operation. This foam station can function at its full potential quickly in an emergency situation. Foam concentrate is stored in a polyethylene or stainless steel tank equipped with an eductor and pick-up tube. The pick-up tube is connected to the tank and utilises a metering device to determine what percentage of foam concentrate is introduced into the water stream. On the inlet of the eductor, a supply fire hose is connected that delivers water from an independent source.

A fire hose and discharge nozzle are connected to the outlet. When in operation, water flows through the eductor creating a vacuum that draws foam concentrate out of the tank to the metering valve of the eductor and into the water stream, delivering foam solution to the nozzle.

■ Foam Trailer

Typically used to protect against liquid spills, diked areas, storage tanks, loading racks or storage facilities in general that contain combustible or flammable liquids, a foam trailer is a complete mobile platform consisting of a trailer constructed with frame, wheels, and axles, non-slid decking, utility boxes, water inlet connections and monitor capable of carrying the total charged weight of the trailer assembly and the foam concentrate.

Trailers utilise either one of two foam storage vessel designs: polyethylene tote(s), single, dual, or multiple, or a rigidly constructed metal foam tank. Monitor utilised are typically of the self-educting type with flow ranges varying from 1893 litres-a-minute to 11,356 litres-a-minute.

Ultimately selection of any firefighting tool should be governed by product(s) being “fit for purpose” and having the appropriate third-party certifications for the intended application. Foam systems prevent or mitigate the chance of costly property loss and business interruption, as well as reduction of risk. Foam hardware, fixed suppression systems and mobile products have met the needs of fire safety professionals, risk managers, fire service brigades, and industrial fire suppression for high-hazard high-risk industries and continue to do so under the guidance of a “balance fire protection plan.”

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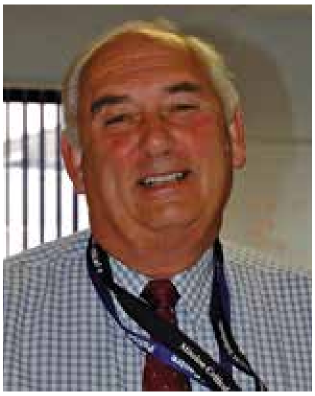
21st Century Decontamination Where Are We Going?

There are few things more uncomfortable and more dangerous than working in a HazMat suit in a HazMat Danger area. There are also few things more exhausting. To the public HazMat Operatives seem rather like tame Martians oddly human shaped but a different colour, moving like automatons, stopping for a rest frequently and avoided by all the normal looking people.



Tim Otter
Chief Executive of Lutra Associates

If there are two more difficult and dangerous places apart from an Ebola ward they involve CBRN (chemical biological radiological and nuclear) threats and the world of explosive ordnance disposal (EOD) and counter improvised explosive devices (CIED); both frequently called "bomb disposal".

CBRN and EOD are probably more dangerous because somebody is deliberately trying to kill you. Both are more uncomfortable, one because it is long term and the other because EOD bomb suits are even heavier, hotter and less comfortable than a HazMat suit. EOD is infinitely more lonely because the operator is cold bloodily working on his own. Bomb disposal was the first military/counter terrorist branch to embrace the use of unmanned vehicles or robots. This development was spurred on by the horrendous casualties among EOD operators in the early days of the bombing campaigns in Northern Ireland.

Many of these casualties were caused by pure bad timing, arriving too late to render the device safe but nevertheless making an attempt to do so. Many others were quite deliberate attempts to booby trap the security forces with secondary devices and anti-handling devices and with yet a third class of device designed specifically to kill the bomb disposal officer with compound and complex devices.

The ability of the British armed forces and their scientific back-up to try to out-think, out-smart and outperform the bombers earned the bomb disposal operators the nickname of Felix, the famed cat with nine lives. A key part of this success was a series of bomb disposal robots developed initially by Graseby Dynamics and then latter by Alvis and latter still by Northrop Grumman. There have been several imitators and many clones but all operated on the basic principle of not putting the man in the suit at risk by deploying his tools to the site of the device and either disrupting or defusing it remotely.

Fast forward a decade or so to the road side bombs of Iraq and Afghanistan and the same issues prevailed. An extremely cheap but effective weapon system or systems was causing high levels of casualties. A key part of the activities to "defeat the device", one of the phases and phrases of the CIED policy, inevitably involved extraordinary bravery and great coolness by individual bomb disposal operators to defuse multiple complex devices and recover forensic evidence to allow actions to "defeat the network". However an increasing reliance was being placed on unmanned robotic devices or unmanned ground vehicles (UGVs). A UGVs' part in the battle was to reduce the effectiveness of IEDs, clear them from key routes and the routes the troops wished to use and make areas safe for civilians to move and live in.

The robots were used to carry tools to the explosive device to disable it, smash the device out of the ground or physically disrupt it so it failed to function. These robots slowly moved from small electric vehicles, usually battery powered, to diesel driven with huge weight carrying capacity, a large range of disruption tools and great endurance and power provision allowing them to move with the troops without having to rely on a vehicle

Image courtesy of SRTC/SCP

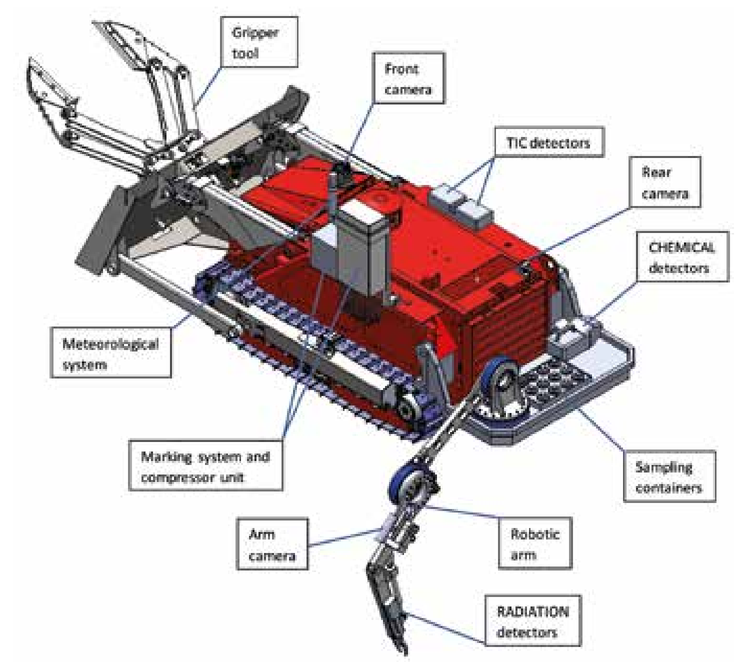
to transport them. They also allowed the troops to concentrate on their job without having to worry about the IED threat because the device took care of it. The state of the art was thus defined. The DOK-ING MV 4 known in the US as the M160 probably set the standard.

A key difference between CBRN and HazMat is that a CBRN target is by definition just that a target as opposed to something that happens to get in the way. This pre-supposes that someone has deliberately attacked it or it must be assumed that it will be attacked. It must therefore be able to resist attack by chemicals of all types, with some more likely than others to be encountered, radiological materials and biological matter. This resistance can come from design for resistance to contamination or for ease of decontamination and build standards including the incorporation of special paints or sacrificial coatings that peel off when contaminated. Whatever the method or combination of methods used the process is designed to remove or minimise deliberate contamination.

In a HazMat situation contamination is distributed randomly in a contaminated area that is not expected to be contaminated. The contamination is not, except in very rare circumstances, the result of a deliberate act. The distribution of contaminant in the contaminated area is a result of serendipity not deliberate action. Who would have thought that a postal sorting office and a newspaper office would be contaminated by hazardous material as they were in the USA? Deliberately preparing everything as the military should do for contamination is unlikely to be possible or affordable. Attempts to decontaminate this sort of target need to take into account a variety of surfaces, substances, materials and concentrations. It is a horrendous task.

Dealing with the task of decontamination is likely to be time consuming, messy and require a lot of people unless it is effectively targeted. The more effective the directing of the decontamination methodology onto the contaminant, the more efficient the decontamination and the less manpower used and, if the decontamination is water based, the less water used. In many areas water supply is a vital consideration. This targeting is achieved by effective survey and monitoring of the target area. In other words there is a need to use instruments to find where the contamination actually is and then when decontamination is administered confirm the effectiveness of the decontamination.

Developing this issue of survey/ monitoring, there is a distinction to be drawn between chemical and radiological substances and hazards and biological material and hazards. In essence the speed of reaction required is the difference between a “lights, bells and sirens” affair for chemical and radiological and a public health event for biological. This is fortunate because radiological and chemical detectors and monitors are capable of rapid agent detection and identification whereas biological sampling and analysis systems can, and often do, take several hours to provide results. The concept is thus to identify the chemical and radiological materials and decontaminate as quickly as possible. People who might be contaminated



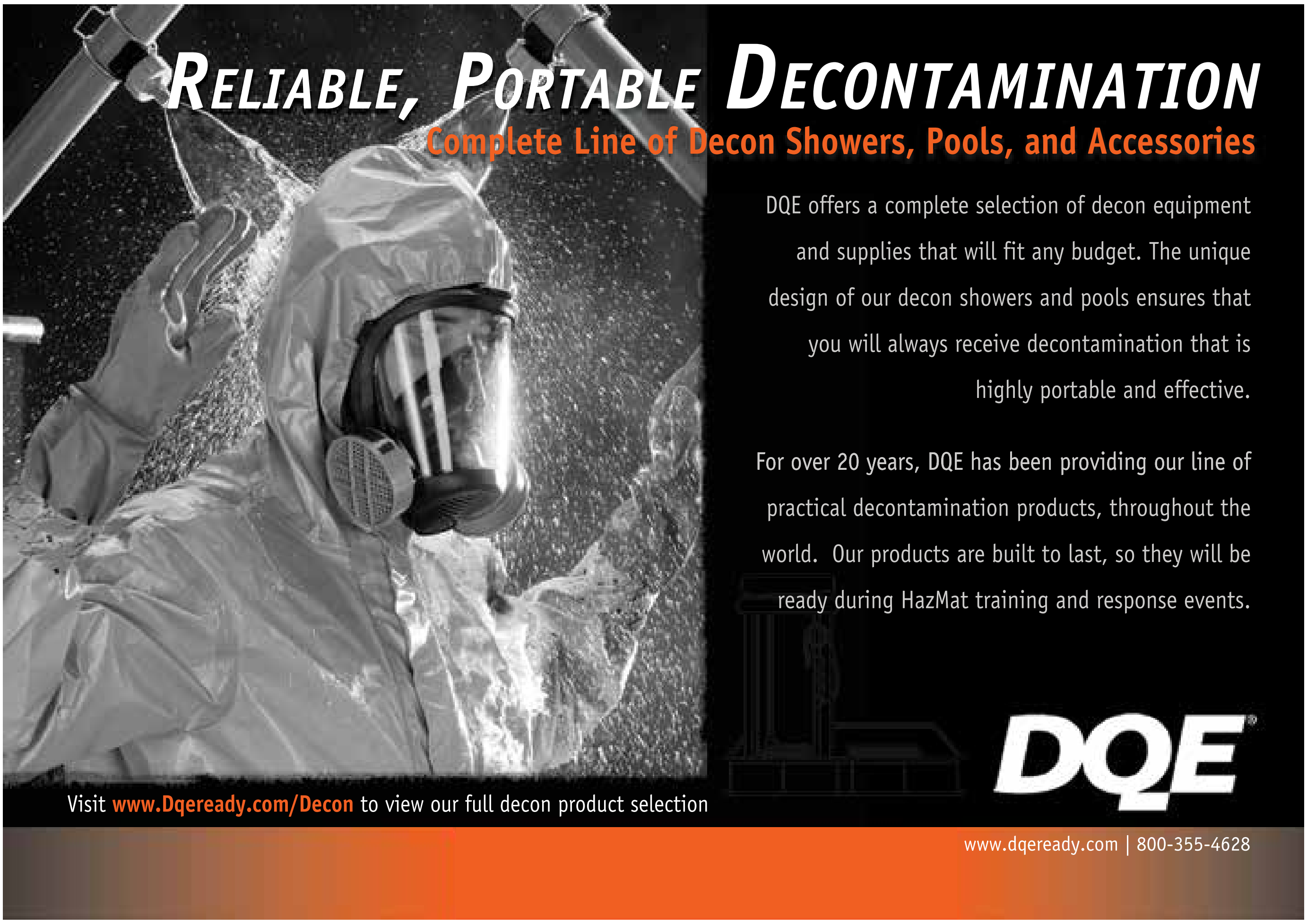
by biological material, for instance the ubiquitous white powder, can be isolated, tested, then decontaminated and treated.

What this means is that within the hot zone there needs to be an effective collection system so that the sample can be collected, tagged for evidence purposes, and, in the case of a biological detector, stored, transported to the detector, for they are large and not robust enough to move into the hot zone, and then analysed. Systems incorporating mimic hands are now coming available that allow this previously very difficult activity to occur. Shadow Dexterous Hand is an example of this.

For all forms of CBRN/HazMat decontamination a water/foam mixture, in whatever concentration/mixture is usually the preferred option. Different concentrations are available for different classes of decontamination. The usual classifications of decontamination targets are people for which RSDL is probably the most popular, sensitive equipment and important equipment and property (again using RSDL or SX-34 sensitive equipment decontaminant from Cristanini SpA) followed by bulk/inert equipment or property.

There are some aspects of HazMat that are not usually required in CBRN probably the main three are; the ability to hear what is going on around the site, the need to cool various elements of the HazMat site and the ability to lift and carry and or rip and pull things apart.

There are now good sound systems that will allow the noises and sounds, for example those of boiling pressurised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gasses or venting explosive vapours, on site to be transmitted over distance so the need for human ears on site is dispensed with, a further distancing of the operator from the danger. Mechanical systems are much better at lifting and ripping and tearing objects on site. They do not get tired and they do not risk tearing the operator's HazMat suit. Water and foam can be mixed and delivered on site. Equally as important as "ears" are "eyes". Good cameras are essential.

All this information and data from sensors is all well and good but what do you do with it. Prediction systems are now available to calculate the contaminated area and predict downwind plumes. To do this they need accurate meteorology data. Marking the contaminated area is important to prevent cross contamination. Again borrowing from the military both these systems are available.

This is a considerable new capability that is being put together. A capability is only as good as the training the users receive. The training the users receive is only as good as the realism and fidelity of that training. Establishments like the Swedish Rescue Training Centre/SCP in Skovde Sweden are the ideal place to train and test operators and commanders alike in the new skills and capabilities and the decisions that surround them and make them an effective team. Once that initial training is complete and people understand the tactics, procedures and capabilities required and available it needs embedding in procedures and constant practice. To borrow a phrase made popular by an animal charity in the UK "HazMat is for life not just for Christmas!" As our world gets ever more complex and chemical there will always be a need for evolving HazMat.

It can be seen that a capability is emerging that takes the best of capability from the EOD/CIED and CBRN arenas and couples it with unique HazMat requirements and turns it into a capability able to do what unmanned vehicles do very well i.e. dull dirty and dangerous tasks. HazMat is never dull but it is certainly dirty and dangerous. This can be done without putting the operators at risk and can be used to get into incident scenes which currently would be inaccessible.

These requirements are something that can be put together on a single platform which allows all of these capabilities to de deployed within a contaminated area, be it a HazMat or CBRN, many of these are common and can be combined. Thus sensing, sample collection, sights and sounds, decontamination, ripping and tearing, meteorology, prediction and marking can all but packaged onto a UGV and deployed to report an work from within the hot zone and deal with the HazMat problem remotely and this surely has to be the way to go, wherever possible removing the man from the danger area.

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Major Advances in Respiratory Protection Standards

This article takes a look at product development for firefighting respiratory protection equipment and explains how the National Fire Protection Association (NFPA) has driven innovation to new levels in this market.

Tony Topf

Global Product Manager at Avon Protection Systems

Established in 1896, the NFPA is an international non-profit organisation with an international membership of over 65,000, spanning nearly 100 nations. Its mission is: ‘to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating consensus codes and standards, research, training, and education’.

Over the past few decades, the NFPA has made significant strides improving standards for many products used in the fire service. A significant number of these improvements were made to respiratory protection equipment; specifically the NFPA 1981 Standard on open-circuit self-contained breathing apparatus (SCBA) for emergency services. Self-contained breathing apparatus also referred to as SCBA or BA’s (breathing apparatus) are common place in fire departments throughout the world. These tools have grown in use and functionality over the past 30 or so years.

Originally designed to provide clean breathing air to firefighters to function in firefighting applications, the functionality and requirements for these systems has grown immensely. Over recent years, manufacturers have added:

- Personal alert safety systems (PASS) devices to assist with man-down notification.
- Voice amplification systems (VAS) to assist with fire-ground communications.
- Emergency breathing support systems (EBSS) to assist with inter-team rescue and rapid intervention.
- Airline connections to support long duration use in confined space and bucket operations.
- Tracking systems enabling rapid intervention teams/rescue teams to quickly locate and save down firefighters.
- SCBA telemetry that brings SCBA information to command, promoting remote team management as well as air management.

NFPA standards have had to change with all of these advancements and in many cases NFPA standards have driven the safety of SCBA systems. Some of the accomplishments include increased breathing rate of SCBA and improved high-heat and flame resistance of many materials used on BA sets, but some of the most major improvements have come from standard changes over the past seven years.

The tumble test first required in NFPA 1982, 2007 edition (Standard for personal alert safety systems (PASS)) added to the durability of PASS systems, but also further improved the durability of the total system, as SCBA is included in the test with integrated PASS devices. A tumble test is conducted in a 1.5-metre stainless steel drum. The SCBA is placed into the drum, and the drum is rotated at 15 rpm for three hours.

The 2007 edition of NFPA 1982 also improved the heat and water resistance for electronics as they added heat and immersion requirements. These tests required the electronics to be exposed to very high heat environments and then dunked into a tank of water. This test by itself challenges the engineering capabilities of SCBA manufacturers, but the test goes further and requires this test to be duplicated six times. On the sixth time, the battery compartment must be open. The pass/fail criteria require proper functionality and no water ingress is permitted into the electronics.

The 2013 Edition of NFPA 1981 brought significant safety improvements to some of the more personal components of the SCBA. For instance, two of the new

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elements pushing product limits are the radiant and elevated heat tests. These tests challenge both the mask and BA's ability to withstand the harshest of environments. The test criteria for these two sets was selected by the NFPA user panel in conjunction with NIST (National Institute of Standards and Technology). They tested many of the fire masks available at the time and continued to increase the challenge until only one mask remained. The results forced all but one manufacturer to change their mask materials, design, or both to pass these incredibly difficult tests. These new mask requirements have driven designs to withstand significantly higher temperatures and many SCBA manufacturers have had their new designs approved for previous editions, so existing customers can benefit from the new mask designs without requiring replacement of the complete SCBA.

Historically manufacturers like Avon Protection, Drager, Interspiro, MSA(Mine Safety Appliances), Scott, and Sperian have provided NFPA compliant SCBA. The 2013 edition of NFPA 1981 has proven so challenging that only Avon Protection, MSA, and Scott have attained the coveted NFPA compliance. Avon Protection was even recently recognised with a GOLD Industrial Designers Society of America, International Design Excellence Award (IDEA) for research relating to its Deltair product development. The engineering efforts were compared to that with companies such as Tesla Automobiles.

Another significant change derived from the latest changes is the approval for use of EBSS (Emergency Breathing Safety System), also known as buddy breathers. This change required collaboration from both NIOSH and NFPA and the outcome was new functional requirements to test EBSS systems, the approval for use of EBSS systems, but the approval for use is limited to firefighters. The reason for this limitation is due to their training efforts and the inherent danger of their jobs. Manufacturers expect an increase in EBSS sales now that the systems are approved and EBSS will continue to be a component of RIT and self-rescue training.

The most significant difference expected to affect many departments SOG's is the modification of the low air indicator set point. Historically NFPA has required that the EOSTI (End of Service Time Indicator) or low air alarm set at about 25 percent of the rated pressure of the SCBA. For instance, if the SCBA was a 4,500 psig system, the low air alarm would alarm around 1,150 psig, providing 25 percent of cylinder pressure for emergency use. The new requirement for the SCBA low air alarm is 33 percent of rated cylinder pressure, but the standard defines 33 percent as 33 percent +5 percent / -0 percent.

The SCBA being shipped may have EOSTI set for anywhere from 33 percent to 38 percent of cylinder pressure. The same 4,500 psig SCBA will now provide a low air alarm at around 1,500-1,700 psig. Some have suggested that this change could affect the ability to work with SCBA of different low air alarm settings, and could affect how many departments purchase SCBA's over the coming years. Many departments buy units periodically and intermingle SCBA from multiple NFPA standards, but the low air setting will make this difficult and its expected that fire departments will change how they purchase to replace the entire fleet when sensible and feasible.

NFPA 1981 was not the only standard with significant changes. NFPA 1982 also added optional transmitting PASS device requirements to the standard, as well as a standardised PASS tone. NFPA 1982 is the Standard on Personal Alert Safety Systems (PASS). The standardised PASS tone requires that all NFPA 1982,

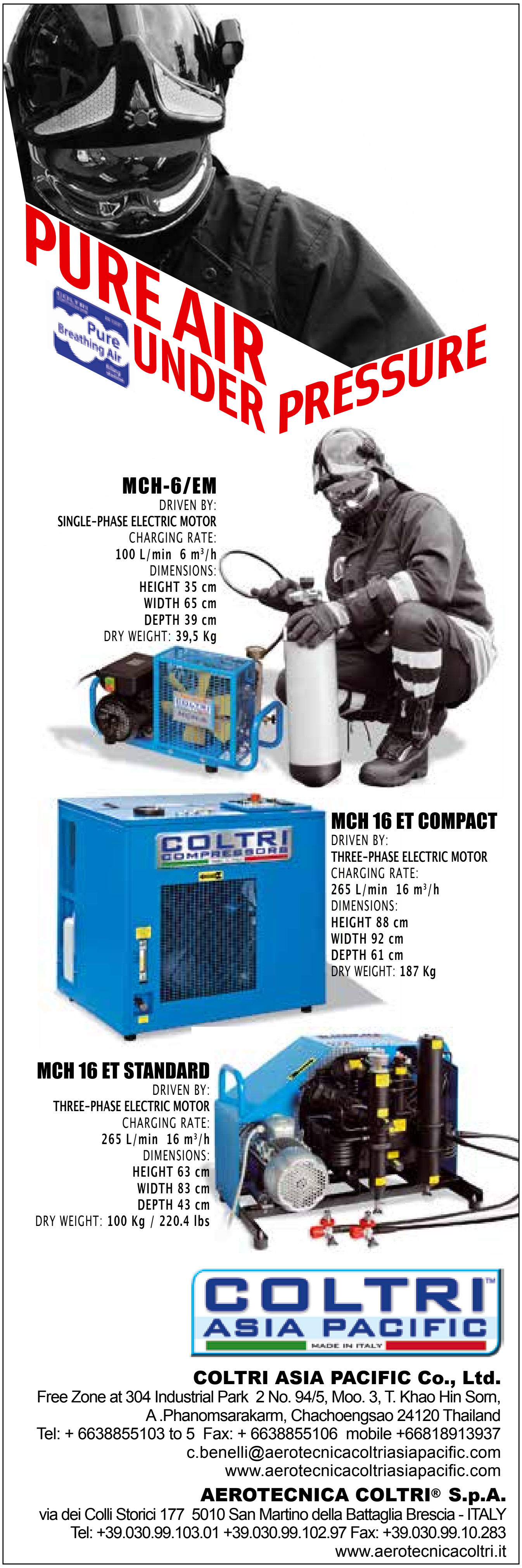
2013 edition PASS devices have similar pre-alarm and man-down alarm tones. The committee recognised that standardising these tones can benefit the fire service in many ways.

First and foremost, the standard tones should reduce confusion in a man-down situation, particularly in mutual aid situations utilising SCBA from multiple manufacturers. These tones are also required to be very similar in the specific timing of the tones, as the committee is considering that in the future there may be a tracking device capable of tracking the tones and providing direction to reduce the time necessary to find a downed firefighter. The market has not yet seen such a device, but once the technology and market demand is in place, some of the NFPA members believe that this technology will be popular.

The new requirements for optional transmitting PASS devices make some believe that the committee may require transmitting PASS devices in the future. A transmitting PASS device is a man-down alarm that sends personnel status, from the PASS, to a remote location via radio transmission. Transmitting PASS devices are also known as SCBA telemetry. The requirements for these systems include all components, from software, to radios, to the user interface. NFPA requires that the transmitter functions in certain conditions and the indications at command must happen within certain time periods, such as PASS alarm or evacuation messages must be transmitted and received within mere seconds of actuation. Once the evacuation function is selected by command, the evacuation indication must be available to users within a short period of time. These are the first steps in standardising transmitting PASS devices, and additional requirements further defining these systems are expected in future editions of NFPA 1982.

The future of firefighting respiratory protection is exciting as new products are developed for the market and for future NFPA advancements.

For further information, go to www.avon-protection.com



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CHARGING RATE:
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DRY WEIGHT: 187 Kg

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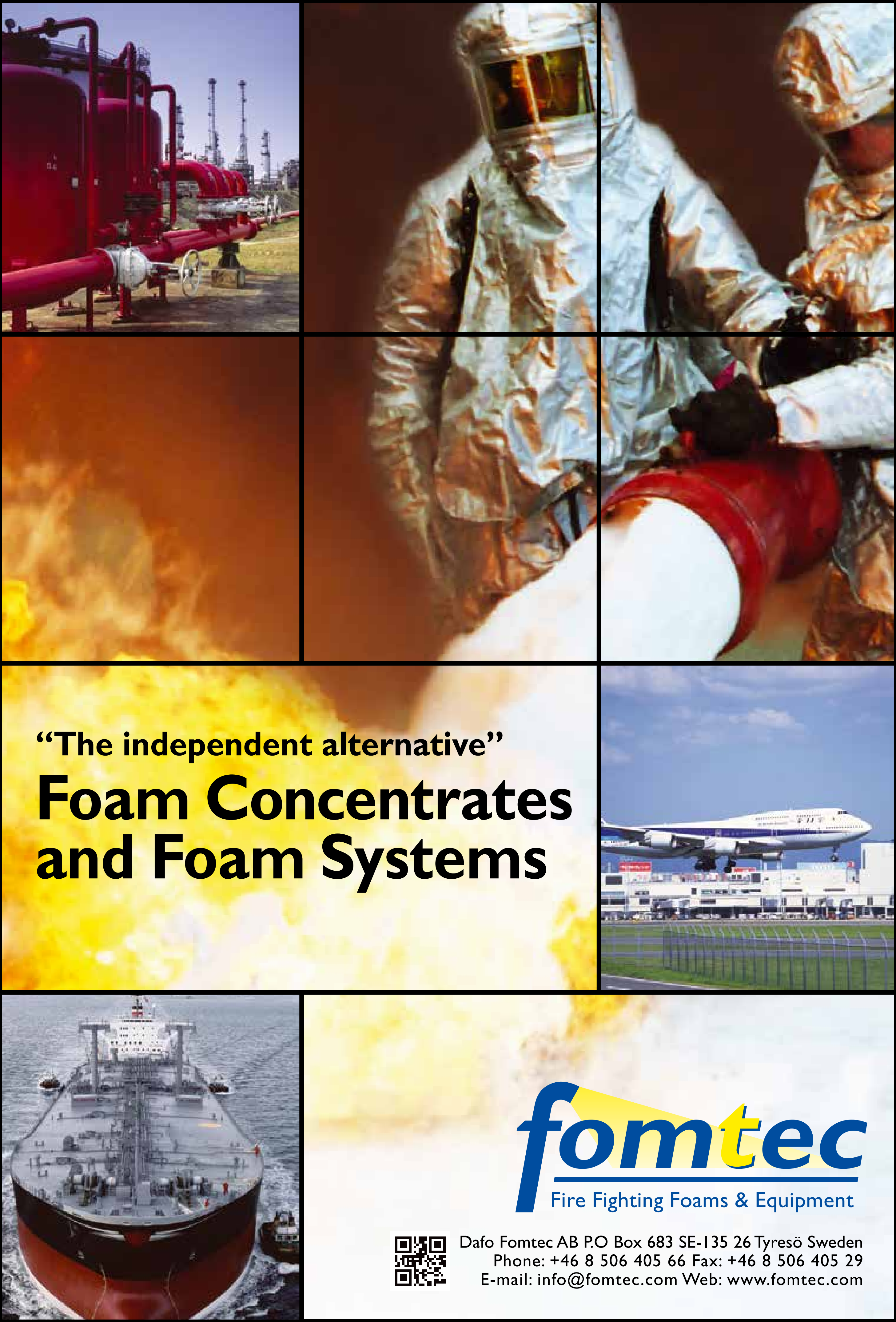

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No Deployment without Communication

Due to the often perilous surroundings and the limited air supplies during deployments with self-contained breathing apparatus, time quickly becomes a critical factor, which can decide between life and death. Communication between firefighters must therefore be clear and quick.

Raymond Boh
Regional Marketing Manager at Draeger Safety Asia Pacific

Training and reliable equipment are a prerequisite for interference-free communication when using breathing apparatus. Constant communication within the team also reduces the stress level of the breathing apparatus wearer, strengthens team spirit, and ensures a timely coordination within the team.

During deployments in chemical protective suits, the breathing mask is not the only thing that impairs communication. The suit itself also absorbs the sound of speech, thus making verbal communication possible only via radio. However, this is problematic because it is difficult and time-consuming for the wearer to actually reach the radio underneath the suit, as he has to move his arm out of the sleeve and to the body. To avoid this, the wearer can use a push-to-talk button, which he can feel and operate through the suit.

Constant communication within the team is essential, particularly during deployments involving the use of thermal imaging cameras. The person operating the camera must also inform the firefighter about the current situation and possible hazard points, as he can only depend on his sense of touch in thick smoke. Furthermore, he can inform the operations command by radio about the exact situation.

For over 50 years, manufacturers have been working on communication solutions for use with self-contained breathing apparatus. In Europe, the developments initially concentrated on the breathing apparatus wearer being able to better utilise his radio, in spite of the mask, by means of a headset. On the one hand, speech is to be transmitted to the radio without distortion and on the other, it is to be made easier for the breathing apparatus wearer to follow radio communication by means of an earpiece. Thanks to headsets, breathing apparatus wearers no longer have to take the radio out of a jacket

▲ **Compressed air breathing apparatus in the 60s, prototype with Southampton communication unit.**

pocket and hold it in their hand, but can send radio messages by operating a push-to-talk button.

The technical difficulties during the development of communication solutions for breathing apparatus applications lie in the fact that speech is absorbed to a great extent by the mask. In addition, the microphone cannot simply be wired to the inside of the mask because the mask must fit snugly and has to be regularly cleaned and disinfected.

Solutions based on scull microphones are easier to realise as they do not interfere with the mask system. Scull microphones pick up the vibrations from the scull, which are generated when a person speaks. They therefore only transmit speech and not ambient noise. Unfortunately, speech quality fluctuates greatly depending on the positioning of the microphone. Creases in the fire safety hood or the mask strapping must not impair contact with the scull. Furthermore, the transmission of higher-pitched voices, for example female firefighters, is noticeably poorer. Thick hair also impairs transmission.

Throat microphones can supply good speech quality when seated correctly. However, due to their cumbersome assembly and troublesome wearing comfort, many firefighters usually reject this type of microphone. Scull microphones and throat microphones are both only available as a headset for connection to radio units. They are not suitable for use in conjunction with voice amplifiers.

Normal airborne-sound microphones, as used in headsets with gooseneck microphones, can pick up damped speech outside the mask. However, they also transmit ambient noise around the breathing apparatus wearer. Communication is thus still possible under office conditions, but can be significantly impaired or even impossible under extreme operational conditions. Furthermore, the gooseneck can get displaced during deployment, so disabling communication.

In the USA and some Asia Pacific countries, the focus for a long time was on transmitting speech to the direct vicinity

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▶ **Dräger FPS-COM-PLUS.**

of the apparatus wearer by means of an electronic voice amplifier in order to facilitate communication. Voice amplifiers can be fitted on certain breathing masks and are battery-operated, but do not substitute for radio communication.

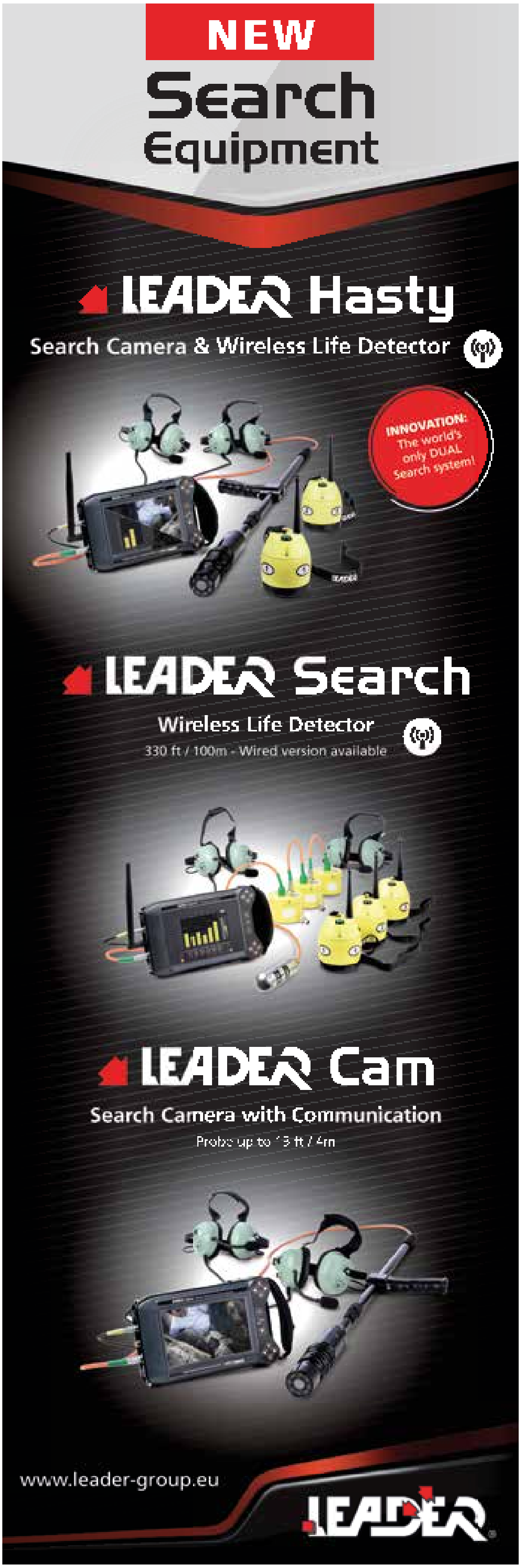
Both development paths not only improve communication, but can also save the firefighter's life in an emergency. To ensure reliable speech communication in the supreme discipline of self-contained breathing apparatus, Dräger has incorporated both development paths in one product – voice amplifier and radio connection. With the FPS-COM-PLUS communication unit, for example, the firefighter has both a fully integrated voice amplifier and an integrated headset at his disposal. A headset does not have to be put on separately as the unit slips perfectly into place when putting on the mask. The wearer can position the flexible earpiece perfectly in front of his ear so that he can understand incoming radio messages clearly and without delay.

The FPS-COM-PLUS picks up speech directly in the inner mask and can thus reproduce it without interference from the voice amplifier and transmit it to the radio unit. Breathing sounds are almost completely filtered out; the mask screens the microphone from ambient noise. Firefighters can thus even send a radio message at extreme ambient noise levels, which the operation's command receives loud and clear. By connecting the FPS-COM-PLUS to the radio unit, evacuation alarms cannot be overheard and emergency calls can be made safely even at very high ambient noise levels.

The unit can be connected to a fist microphone, a big push-to-talk button or directly to a radio unit by means of a robust jack plug. When connected directly to the radio unit, the radio unit is activated by an integrated push-to-talk button on the mask.

The FPS-COM-PLUS is ATEX approved for use in explosive areas (Zone 0), EN 136 und EN 137 Type 2. A decisive factor for many fire departments is the fact that the communication solution integrated in the mask not only increases safety in an emergency, but contrary to distress signal units and detectors, reduces stress levels and increases the efficiency of firefighters even in normal daily operations.

For further information, go to
www.draeger.com/fire



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Tel: 60 37311286
Fax: 60 37340583
Email: cito@po.jaring.my
Dealer/Distributor

SJA TRADE & SERVICES SDN BHD.
Kelana Center, Suite 72, Blk 1
Jalan SS 7/19 Kelana Jaya, Selangor
Darul Ehsan 47301
Contact: Hetty Zurin Hamdan
Tel: 60 37847400
Fax: 60 37848500
Dealer/Distributor

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SMARTGUARD PHILIPPINES INC
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Negros Occidental 6100
Telefax: +63 34 7091549
Mobile: +63 918 8881729
Email: rescue@smartguardphilippines.com
Dealer/Distributor

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JINUTEC INTERNATIONAL DIVISION
711 Visiontop Officetel 374-4
Won Dong, Osan City, Korea
Contact: Na Hae-Yul
Tel: 82 31 3758558
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Email: hyna@jinutec.com
Website: www.jinutec.com
Dealer/Distributor

TAIWAN
ALL STRONG TRADING CO LTD
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Isian Bldg, PO Box 46-482, Taipei
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Tel: 886 2250 79976 Fax: 886 2250 75253
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Website: www.sunmoreinc.com
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Pemimpin Industrial Bldg, Singapore 577219
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Dealer/Distributor

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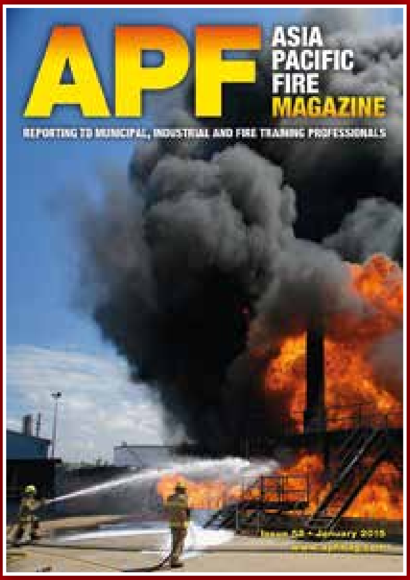
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ADVERTISERS' INDEX

3M Singapore	28
Advanced Electronics	52
Apollo Fire Detectors Ltd.	55
Bauer Compressors Asia Pte Ltd.	76
Bio-Ex	73
Bristol Uniforms Ltd.	47
Coltri Asia Pacific Co Ltd.	77
Cutters Edge	69
Dafo Fomtec AB	78
DQE, Inc.	72
Draeger Safety Asia Pte Ltd.	OBC
Dr. Sthamer Hamburg	15
DuPont Performance Chemicals	IBC
Dynax Corporation	4
E2S	67
Fike Corporation	35
Fire Fighting Enterprises	37
Firemiks AB	21
Fire Protection Technologies	32
Firetrace International	57
Flir Systems	39
Intersec 2015	24
Kochek Company Inc.	66
Leader S.A.S	81
Hainsworth	43
HD Fire Protect Pvt Ltd.	39
Holmatro Rescue Equipment	74
Janus Fire Systems	35
LHD Group Hong Kong Ltd.	45
Pacific Helmets (NZ) Ltd.	48
PAB Akrapovic	51
Pelican Products Inc.	61
Rosenbauer International AG	8
Safety Components, Inc.	40
Solberg Company	62
Task Force Tips, Inc.	IFC/1
Teikoku I-Sen Co.	27
Tempest Technology Corporation	80
TenCate Protective Fabrics	6
Texas A & M Emergency Services Training Institute	43
The Viking Corporation (Far East) Pte Ltd.	31
TLX Technologies	65
Tyco Fire Protection Products	2
Waterous Company	19
Ziamatic Corporation	37

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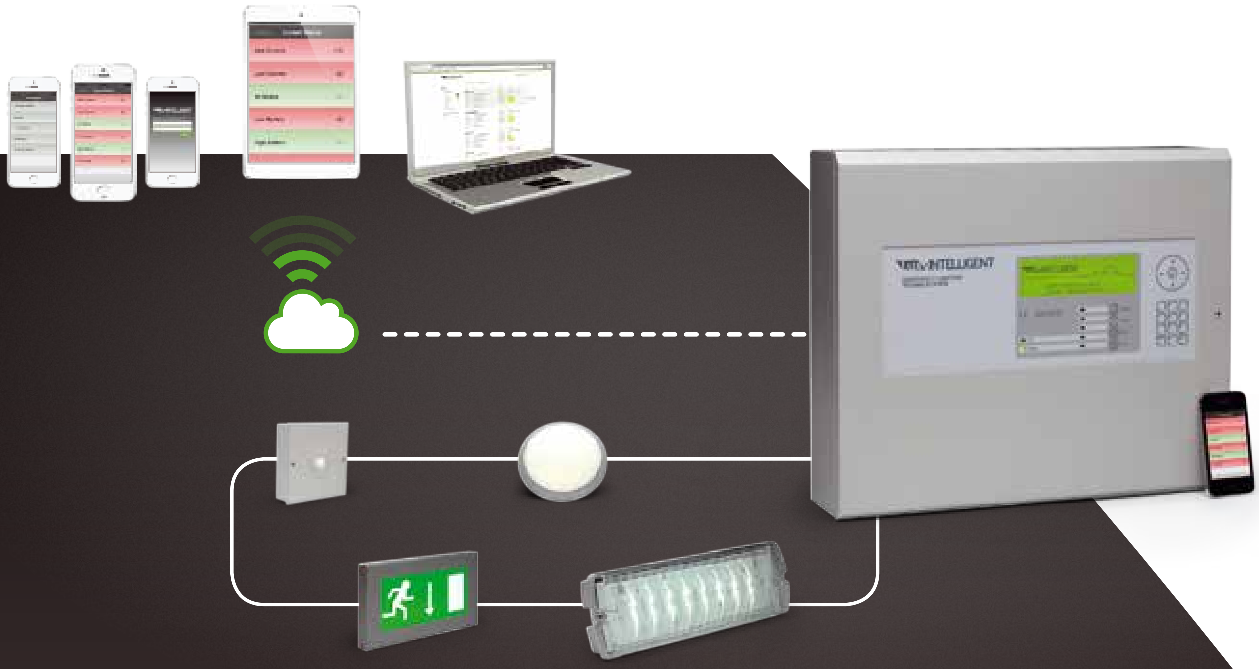

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Contents

APRIL 2015

REGULARS

5 APF Comment
7 Industry Comment
8 News and Profiles
49 Buyer's Guide

FEATURES

20 Hainsworth the Innovator Meets Needs of Firefighters
23 Neil Bibby talks with... Dr Peter Meikle, Xtralis Pty Ltd
26 Primetech – Pioneers in Communication
30 Online Forums Showcase Bushfire CRC Research
33 Beware of Counterfeit Fire Detection Devices
37 PPE/PPC – The Last Line of Defence
41 Fire and Rescue NSW – Planning for the Future
55 Important Information on Smoke Alarms
59 The Role of Standards in Fire Risk Management
63 Building in Bushfire Prone Areas – Considerations for Construction
69 The International Search and Rescue Advisory Group
75 Defence Science & Technology Organisation, CBRN Research
81 Where to next with Fire Modelling?
84 Creating an Above Ground Fire Shelter
86 Protecting Fire Sprinklers from the Human Element
80 Advertisers' Index

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A new face at Asia Pacific Fire

This is my first edition of *Asia Pacific Fire* and I look forward to many more. I have many years experience in the fire industry, both in the fire service and the fire protection industry having been President of the Fire Protection Association of Australia and Chief Executive Officer of the Country Fire Authority, Victoria. For those that are interested my LinkedIn page will give you more details.

Neil Bibby
ASFM, FAICD, MIFireE
Editor

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or via LinkedIn – Neil Bibby.

I would like to thank Graham Collins for his years as Editor of *Asia Pacific Fire*, Graham's dedication has seen the magazine grow considerably under his leadership. His network and understanding of the industry has made APF a must read for many in the profession and he will be missed. I am hoping he will continue to make his voice heard in the future.

What of the future? As Graham highlighted in his final editorial, the industry is facing many challenges, the most pressing of these being climate change. In the past ten years we have seen a continual increase in days with high temperature, changing weather patterns and weather created disasters; fire, flood and cyclone to name a few. Add to this the increased human habitation of areas prone to fire, flood, earthquakes, cyclone and tsunami. No longer can emergency agencies stay in their designated silos of fire, ambulance and civil defence (SES). It is now an integrated multi discipline approach to disaster. These changes in the disaster environment are changing the profile of traditional fires services morphing them into civil disaster organisations.

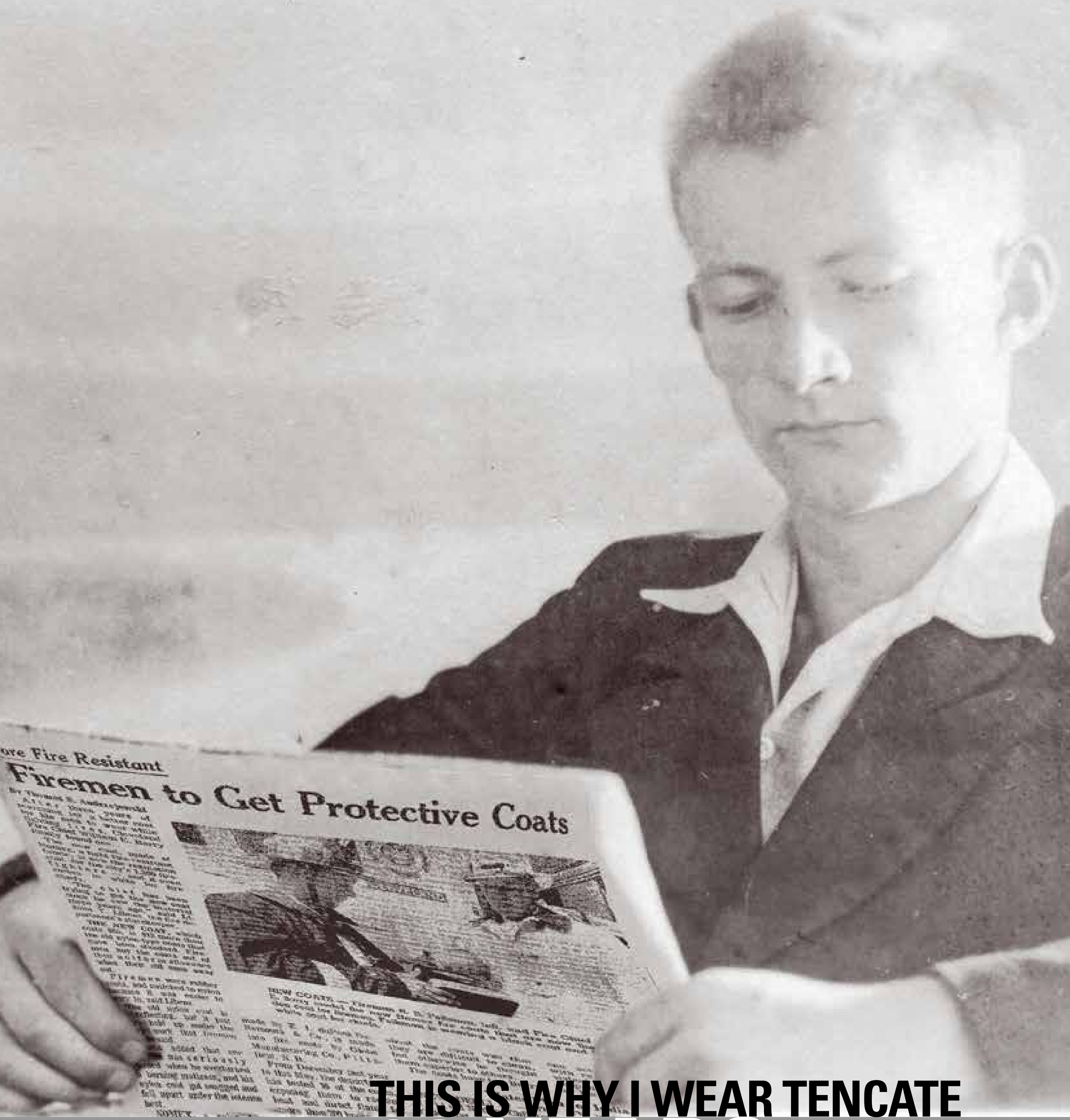
Social media and interaction with the public and business are becoming more the norm, agencies are seeing that they are no longer the white knight that comes over the hill to save the day. They must work in conjunction with their communities to plan and prepare in a joint effort, this is the only way communities can truly mitigate the impact of a disaster.

Another string to our bow is the safety industry, those people that make alarms, fire doors and emergency equipment as well as developing and running training programs. In many cases, these are the people that save more lives than firefighters. The simple domestic smoke alarm has saved thousands from death or serious injury. Not many understand the millions of dollars that go into developing new safety systems and then getting them approved by the regulators. The safety industry is the where corners are sometimes cut because short sighted people looking at expenses do not see the benefits of risk reduction until disaster strikes.

These three groups – agencies, the public and the safety industry – working together are what keeps us safe and in the event of a disaster helps to mitigate the damage and return things to normal as quickly as possible.

Asia Pacific Fire intends to inform our readers of what is happening in these three areas specifically concentrating in this region. Unfortunately we are in a high risk geography with earthquakes, tsunamis, volcanoes, cyclones and wildfires continually reminding us of why we should be kept informed.

I see my job in future editions is to select best practice and pass this on to you, the reader. This editorial space will be used to challenge the status quo and I look forward to receiving emails with all your views, supportive or dissenting. If you are not already following us on twitter find us at @APFMagazine and have a look at our new web page **www.mdmpublishing.com**.



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Advocacy in Overdrive – The Work of FPA Australia

As the peak body for fire protection in Australia, Fire Protection Association Australia (FPA Australia) takes its mandate to advocate best practice fire protection outcomes for the community seriously.

Scott Williams
FPA Australia CEO

Since 2012 we have expanded our capability significantly to make strong representation for our industry and the community on all fire safety matters. The Association is focused on all elements of fire protection in both the built and bushfire environments, from initial design, installation and commissioning, certification, and ongoing inspection, testing and maintenance.

As a result we have seen some incredible changes in the way that fire protection and safety are regulated in this country. An important turning point in the evolution of fire protection regulation was the official release of Australian Standard 1851-2012 *Routine Service of Fire Protection Systems and Equipment*. This standard, which was released in December 2012 and superseded the 2005 edition, sets out the inspection, test, preventative maintenance and survey requirements to demonstrate that the fire systems and equipment installed in a building are achieving a standard of performance to which they were designed (the approved design). Since its release FPA Australia has worked tirelessly to see this standard adopted as recognised best practice for fire protection maintenance in all states and territories of Australia. As a direct result of this work, the standard has now been formally adopted by all states and territories except Victoria, which is expected to introduce the new standard in its revised building regulations in 2016, and the Northern Territory, which is likely to announce the change in the very near future.

Successfully lobbying policymakers to change regulation is painstaking work and the successful adoption of AS 1851-2012 to a nearly nationally harmonised level is the result of many hundreds of meetings and thousands of hours of work behind the scene. But there is a highly beneficial pay off, both for buildings owners and residents, our members (fire protection companies and technicians) and the public at large: AS 1851-2012 reduces the frequency of some activities (which also reduces costs for building owners) while enhancing the most important safety aspects of the standard, a true win-win outcome.

In addition to this critical advocacy work, the Association also ran national seminars on AS 1851-2012 instructing members and other relevant stakeholders, including facility managers and building owners, about the changes to be implemented with the launch of the new standard. FPA Australia has also developed a suite of highly detailed recording and reporting logbooks in-line with the new standard to ensure that best practice and compliance to the new standard can be achieved and maintained with maximum confidence.

Pursuing the national adoption of AS 1851-2012 is just one way the Association is delivering on our vision of leading and supporting a professional industry to minimise the impact of fire on life, property and the environment, for a safer community. Another critical milestone on this journey occurred in 2014 when the Association was invited to participate on the Australian Building Codes Board (ABCB) Building Codes Committee (BCC). The BCC is ABCB's peak building technical advisory body and the national forum for regulatory authorities and industry to consider technical matters relevant to building regulation reform. Our invitation to, and participation on, the BCC is yet another way we are advocating for our industry and the community as the peak body for fire protection.

Finally, it is important to note our significant and ongoing work in introducing our own framework for professionalisation. This has been achieved with the launch of our fire protection accreditation scheme (FPAS). Launched in July 2013, FPAS is the only nationally harmonised accreditation system designed to recognise the skills and competencies of individuals working in the fire protection industry across all state and territory jurisdictions in Australia.

The Scheme is the Association's way of highlighting those individuals and businesses that are committed to the highest standards of community fire safety through the ongoing professionalisation of their workforce. The Scheme currently operates in the Inspect & Test class of fire protection work (AS 1851), with almost 700 fire protection technicians already accredited. Recently the Association announced the opening of expressions of interest for the next two classes of Accreditation under FPAS: Fire Systems Design and Fire Systems Certification. It is expected these two classes will be officially launched prior to June 2015.

These are just some of the many ways that FPA Australia is taking an important leadership role and living up to our vision, mission and values. We will continue to play our part as the peak body for this fantastic industry as we work towards a community safe from fire related incidents.

For further information, go to www.fpaa.com.au

Bullard Introduces X Factor Series

The Eclipse LDX is equipped with the latest state-of-the-art infrared engine technology and image processing techniques from **BULLARD**, the leader in thermal imaging technology for the fire service. Eclipse LDX incorporates Image Contrast Enhancement (ICE™) technology for the ultimate image performance in fire conditions. ICE technology sharpens the distinction between objects and regions and optimizes the image for greater clarity.

The Eclipse LDX runs at an ultra-fast 60 Hertz image update rate and is equipped with a new LCD display that increases brightness and improves contrast, allowing firefighters to see more clearly in thick smoke and direct sunlight. In addition, the Eclipse LDX is equipped with a new power button for easier powering on and off with a gloved hand. Weighing only two pounds, Eclipse LDX is available with a 240 x 180 or 320 x 240 ultra-high resolution infrared engine.

The Eclipse LDX can be equipped with Bullard's exclusive Electronic Thermal Throttle® (ETT), which enables firefighters to reveal hidden fire and distinguish hotter objects with the touch of a button. Other optional features include Super Red Hot colorization, highlighting high-heat scenes in brilliant shades of yellow, orange, and red; temperature measurement; and an integral DVR.

The X Factor Series of thermal imagers includes the Eclipse LDX, T3X, T4X, and Eclipse X. Bullard plans to release the T3X and T4X in the first quarter of 2015, followed by the Eclipse X. For more information about the X Factor Thermal Imagers contact Bullard Asia Pacific office at +65 6745 0556 or email us bullardasia@bullard.com.

For further information, go to www.bullard.com/xfactor

Holmatro adds Quattro pumps to Spider Range

With the introduction of new Quattro pumps **HOLMATRO** adds more options to its Spider Range. Thanks to their large oil content these pumps can operate any four rescue tools at the same time and multiple tools successively, including the biggest rams. Rescuers can choose between three different models: petrol-powered, electrically-powered or petrol-powered with electric start.

Next to a large hydraulic oil content the Quattro pumps offer various user-friendly features like soft-grip carrying handles, an integrated dip stick for quick and easy monitoring of the oil level and optional LED lighting which facilitates (un)coupling of hoses in the dark. They are equipped with CORE Technology as standard.

About the Spider Range

Holmatro Spider Range pumps incorporate 3-stage pump technology for faster tool operation in the most commonly used working pressure range. This is achieved by a higher flow in the pumps' second stage, which makes your rescue operations much quicker. The range consists of 4 main models with a variety of features and options to meet your personal requirements. These include (but are not limited to) hose reels, a Quick Fix & Release Bracket for easy access to the pump in your rescue vehicle and ECO whisper mode to reduce noise and fuel consumption. All pumps are equipped with a robust frame for protection against hard knocks and falls.

About CORE Technology

Traditional twinline or dual hose systems work with two separate hoses: a high-pressure hose to supply hydraulic oil to your rescue tool and a low-pressure hose for the oil return to the pump. Holmatro's CORE system only has one hose, which is actually a high-pressure hose inside and protected by a low-pressure hose. Being para-aramid fiber reinforced, a CORE hose is lighter than traditional steel reinforced hoses and also does not have the risk of kinking or pinholes. It comes with an easy to clean flat-faced coupler at both ends which locks automatically in just one push. Holmatro introduced this technology back in 2005 and since then it has become the new standard for rescue equipment in many parts of the world.

More information on www.holmatro.com

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Emergency Pump Units for Power Plant

Following the Fukushima nuclear disaster in 2011, safety regulations at many nuclear plants have been considerably tightened, this has led to an increased demand for fire fighting pump systems. These systems must comply with extremely strict requirements and regulations. Working closely together with the Belgian distributor Rental Pumps, **BBA PUMPS** has recently completed one of the most demanding projects in its history – the delivery of nine mobile disaster relief pumping systems. These pumps are supplied to provide an extra level of safety in a large nuclear power plant.

Operational capability

The high pressure pump units are not only meant to fight fire – their main goal is to prevent a meltdown in a worst case scenario. In the event of a total black out, the pumps will be deployed to pump cooling water into the primary circuit of the reactor as a last resort. They can even be used to supply a boric acid solution in order to shut down the nuclear reaction completely.

The challenge

Fire fighting pump systems are almost always supplied with customised features. In these situations, BBA Pumps uses the standard high head pumps from the BA series. These pumps are dry self-priming and are available with a maximum pressure of up to 25 bar/360 PSI. The specifications for the engines and total arrangements can vary widely between projects. For this nuclear plant project, the list of demands was exceptionally high:

- No fewer than 132 material and safety certificates were needed for each pump vs. a minimum of primary technical engine safety features.
- Each pumping system had to be supplied with a storage rack and flow meters, and be able to operate autonomously at maximum output for 24 hours.
- For logistical purposes, a 3 axle trailer with compressed air brake systems.
- The pumping systems had to pass a SQUG test for seismic activities.

Delivery of pump units

- 4 pumping systems, equipped with a high head pump type BA80H D275, powered by a Perkins four cylinder diesel engine, type 404D-22T. This pump supplies a pressure of up to 9 bar / 130 PSI and a flow of 130 m3/h / 572 US GPM.
- 5 larger pumping sets with a high pressure pump, type BA-C150H41, powered by a Volvo Penta, type TAD952VE, with a power output of 234 kW / 318 Hp and an operating point of 20 bar / 290 PSI at 130 m3/h / 572 US GPM.

This is what the Belgian BBA Pumps distributor had to say

Lieven Vijverman, CEO of Rental Pumps Belgium: “I’ve never seen such high demands set by any client. Nevertheless, the cooperation with BBA Pumps went off without a hitch and we have learned a lot during this project; we are very proud to be able to add a nuclear power plant to our reference list”.

For more information, please visit www.bbapumps.com

New Structural Fire Fighting Helmet

PACIFIC HELMETS (NZ) LTD combines safety, comfort, quality, and style through the new Pacific structural firefighting helmet, the F10 MkV. With a Kevlar® and fibreglass composite shell, the F10 MkV is incredibly light and, like all Pacific Helmets, is designed to last you a lifetime. The new shape and low ride height enhances the balanced feel of the helmet while utilising the latest chinstrap, headband, and liner designs from Pacific Helmets to provide you a comfortable fit over long periods of wear.

Features available include the One Touch Eye Protector; Bubble Face Shield; Neck Protectors in various shapes, colours, and designs; Easi On/Off Bases for torch attachment; rear hanger; BA mask clips; and front plinth. Customised reflective trims and decals are available to make the F10 MkV fit your brand.

The F10 MkV is available to standards EN443, NFPA 1971, and AS/NZS 4067.

For more information, go to www.pacifichelmets.com

W. L. Gore & Associates

Meeting the Challenge of Stored Energy

There is no question that firefighters are better protected than ever before thanks to the huge advances made in technical fabrics over the last twenty years.

Structural fire kit is designed to protect the wearer from extreme heat and flame. Whole garment ensembles are regularly tested on manikins equipped with sensors in flashover conditions to evaluate protection performance and resistance to serious burns. These tests are carried out in special test facilities and normally involve the ensembles being exposed to the flashover flames for eight seconds at temperatures in excess of 1000 degrees. Composite swatches of the fabrics used in the garment are also tested in laboratory conditions.

However it is a modern day paradox of firefighter protection that the gear which will protect in the extremes of a flashover, does not always protect from burn injuries that can occur in sub flashover conditions. That is the type of injury that can occur when energy stored within the layers of the protective clothing is suddenly transferred to the firefighter, resulting at times in burns, but with no sign of any damage to the PPE or outer fabric.

While it's essential that PPE is designed to protect from the extreme conditions, firefighters do not face them every day. In normal fire-ground conditions it is possible that a firefighter can be exposed to radiant heat for relatively long periods of time, which causes a build up of energy inside the layers of their protective clothing. When clothing is then compressed against the skin, for example when a firefighter crouches or flexes an arm, that stored energy transfers through and can result in a burn.

Some of these burns have been associated with reflective trim or additional reinforcement material that is attached to the outer shell of the garment. Also, the use of additional equipment such as harnesses for breathing apparatus can be a factor.

The presence of moisture within structural kit, accumulated from water spray or sweat has also been associated with stored energy or "steam burn" phenomena.

Performance standards for PPE in the USA and in Europe set the benchmark for testing against the most extreme environments but do not currently address the issue of stored energy. Similarly, structural firefighting suits and fabrics are always tested in dry conditions. They are never tested wet, which doesn't take account of the risks of burn injuries associated with stored energy.

There are so many variable factors that potentially impact stored energy burns it is no easy feat to develop a detailed understanding of the issue and most of the current knowledge is reliant on anecdotal evidence from firefighters.

In Europe, the standards committees are reviewing requirements for a new physiology annexe to EN469. In the USA the NFPA 1971 standard introduced a requirement for a thermal insulation test that measures stored energy.

What all of this underlines is that it is so far impossible to create one standard fire suit that will protect from all eventualities on a fire-ground. However progress since the cork helmets, woollen jackets and PVC leggings of 25 years ago has been dramatic.

An incredible level of protection from flashover has been created and that is unlikely to change much in the coming years, as the focus moves to physiology and comfort and dealing with the variables that contribute to the effects of stored energy. This is where the next major changes in firefighter PPE will occur. It will be driven by testing against a much broader range of conditions than just the extreme and will eventually include all of the components that impact PPE as one unit, rather than testing each in isolation.

▼ Dave Frodsham, Product Specialist with W. L. Gore & Associates (UK) Ltd, manufacturers of the GORE-TEX® and CROSSTECH® Fabrics used to protect firefighters around the world

For more information, go to www.gore-workwear.co.uk

PRODUCT PROFILE

Reliable Sprinkler

Meeting the Warehouse Sprinkler Challenge

The protection challenges for storage commodities have increased with the storage of more plastic commodities, whether cartoned or uncartoned, expanded or unexpanded. Building heights have also increased, particularly with the use of high-bay storage using automated storage and retrieval systems.

The use of ceiling-only sprinklers has not been an effective method for suppression or control of rack storage fires when the ceiling height exceeds certain limits and/or the stored commodities are exposed or expanded plastics. This has concentrated the minds of the fire sprinkler community in search of effective solutions to this challenge.

The concept of using horizontal barriers and large K-factor extended coverage storage sprinklers as in-rack protection came from observations and early results of The Fire Protection Research Foundation's (FPRF) Exposed Expanded Group A Plastic Test Series. This research was conducted to look at ceiling-only sprinkler protection for rack storage of exposed expanded Group A plastics. Protection schemes for these applications have been outside the scope of the NFPA Standard 13, chapter 17 (see Figure 17.1.2.1 "Exposed Expanded Plastics"). FM Global Data Sheet 8-9 does provide design criteria for ceiling-only protection of exposed expanded plastics with ceiling heights up to 12.2 metres using a specific brand of sprinkler. However, the water demand is extremely high. The FPRF wanted to reduce the water demand and elected to test using vertical barriers on every other rack upright or approximately 4.9 metres apart.

After a series of several tests, the FPRF proposed a suggested design for NFPA Standard 13 using vertical barriers. The basics of the design: 12.2-metre ceiling height, 10.7-metre storage height, 2.45-metre aisle width, vertical barriers at 4.9 metres intervals, K-25.2 Pendent ESFR sprinklers installed at the ceiling, 4.1 bar minimum for each sprinkler, the flow to be calculated for a minimum of 12 sprinklers operating and a hose stream allowance of 946 litres-a-minute for a 60 minute water supply duration.

However, because of water distribution tests that were being conducted on the performance of a K-25.2 extended coverage pendent storage sprinkler as an in-rack sprinkler, a decision was made to conduct a series of fire tests at UL using a horizontal barrier and/or multiple horizontal barriers and not the vertical barriers being used in the FPRF test series. It was postulated that the K-25.2 extended coverage pendent storage sprinkler would provide superior performance because of its extended coverage spray pattern, its ability to flow a large quantity of water at low pressure due to the 25.2 K-factor, and the fast responding characteristics of its low thermal mass solder releasing element.

Subsequent tests produced successful results on both exposed expanded and cartoned unexpanded plastic commodities for various storage and building heights. Test results showed high levels of fire control with very few fire sprinklers opening during the tests resulting in lower overall water demand of the fire sprinkler system compared with current ceiling-only protection schemes. Additional tests have also shown this system as being effective in protection of multiple row racking arrangements, in the case of 1.2-metre narrow aisles and for storage of flammable liquids. The additional tests have also indicated the suitability of this system as an alternative to existing ceiling only protection schemes where water supply is a major issue.

The intent of these tests is to create a pool of data for design professionals to use in a "performance-based design" in order to protect commodities and arrangements beyond the current scope of the NFPA Standard 13 or other International standards.

For more information, go to www.reliablesprinkler.com

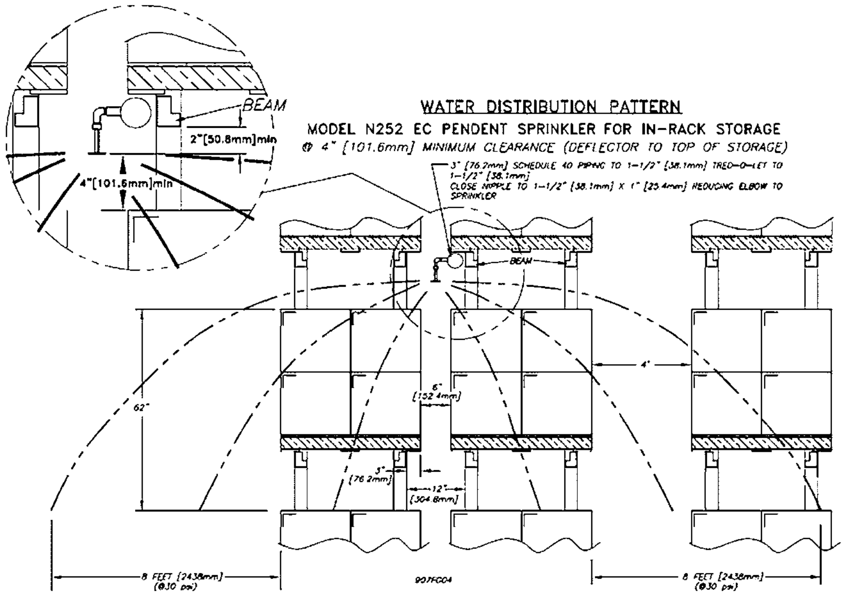
BEAM
2"[50.8mm]min
4"[101.6mm]min
WATER DISTRIBUTION PATTERN
MODEL N252 EC PENDENT SPRINKLER FOR IN-RACK STORAGE
@ 4" [101.6mm] MINIMUM CLEARANCE (DEFLECTOR TO TOP OF STORAGE)
3" [76.2mm] SCHEDULE 40 PIPING TO 1-1/2" [38.1mm] TRED-O-LET TO 1-1/2" [38.1mm]
CLOSE NIPPLE TO 1-1/2" [38.1mm] X 1" [25.4mm] REDUCING ELBOW TO SPRINKLER
BEAM
4'
62"
6" [152.4mm]
3" [76.2mm]
12" [304.8mm]
8 FEET [2438mm] (@30 psi)
907FG04
8 FEET [2438mm] (@30 psi)

Image courtesy of Reliable Automatic Sprinkler

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Protectowire Firesystems Announces CTI™ Linear Heat Detection

PROTECTOWIRE FIRESYSTEMS announces the release of an advanced product line of Linear Heat Detectors utilizing Confirmed Temperature Initiation (CTI) sensing technology. This patented technology reaffirms the company's tradition of developing advanced and innovative fire detection products. Utilizing the thermoelectric effect, the new detectors have been designed to generate a more accurate heat response and to eliminate false alarms caused by mechanical damage. Patents have been issued in the US and other countries.

The basis of CTI combines two proven and reliable technologies using the thermoelectric effect, that in this application, delivers a confirmation of actual heat from combustion or fire. With CTI, any short circuit caused by mechanical damage to the detector will not signal a false alarm, but be detected as a trouble or fault condition on the detection circuit.

With CTI a new approach has been taken. Protectowire FireSystems has combined the thermoelectric effect with proven digital heat detector technology and a special interface module, into a new multi-criteria detection system. The smart interface module is able to interpret electrical changes caused by heat. Using advanced confirmation protocols, the module provides reliable digital detector operation with true short circuit fault identification. Alarms are activated only when the temperature at the alarm point exceeds the established alarm threshold thereby providing true Confirmed Temperature Initiation (CTI). The result is a highly accurate and reliable fire detection system for high risk commercial and industrial applications.

Image courtesy of Protectowire

For more information, go to www.protectowire.com

Husqvarna K 970 Rescue Cutter

Our most powerful rescue cutter is specially developed for rescue and clearing work. The chromium-plated blade guard is designed to be visible in smoke and water spray, and the digital ignition system provides a reliable and quick start in any emergency situation. Used and trusted by fire services around the world.

- Optimal ignition timing makes the power cutter start easily in any situation.
- Light and powerful.
- Long service intervals
- The only time the filter needs to be checked and changed is if you experience lack of power.
- High power with less fuel.

Husqvarna

- Our two-step filtration system with centrifugal cleaning and a single paper filter increases product life and extends service intervals.
- Reduced wear thanks to the drive belt with fully sealed transmission, which keeps out the cutting dust.
- Our X-Torq® engine produces less emissions, lower fuel consumption and produces more power.
- Blade retarder.
- Our built-in automatic filter compensation maintains high power during the air filter life time.
- Our dust-sealed starter, where the return spring and the pulley bearing are sealed, gives a virtually maintenance free starter. Developed with a durable starter cord.
- Possible thanks to the reversible cutting arm.
- Reduced vibrations in the cutter handle for more comfort and longer operation periods.

For more information, go to www.husqvarnacp.com

Coltraco Ultrasonics Monitoring Fixed Fire Suppression Systems

COLTRACO ULTRASONICS is a leading UK based OEM of ultrasonic measuring equipment for the maintenance and monitoring of fixed fire suppression systems.

The company was originally started back in 1987 and manufactured one product called Portalevel™ which had been developed for use on board naval vessels to monitor fixed fire suppression systems. From those origins Coltraco has developed to the point where they manufacture 14 systems and products.

The company has developed quickly by identifying an issue when it came to monitoring and checking fire suppression systems in industrial facilities and offshore environments, both shipping, and oil and gas.

Traditionally the method for monitoring fire suppression cylinders was laborious and time consuming. The process involved removing and weighing each individual cylinder one at a time. Not only was this process time consuming it was dangerous as well. Typically, an annual maintenance check was considered adequate. As industry, particularly Oil and Gas, has become more safety conscious, so has the awareness that the fire suppression system needs to be adequately monitored.

From this beginning they now work across a number of industry verticals including, Oil and Gas, Marine and Shipping, Naval and Defence, Data Centres, Power Plants and High Rise Buildings.

Today there are 8 different types of Portalevel™ from Portalevel™ Original to the flagship Portalevel™ Max which has been UL approved. Portalevel™ Max offers users the quickest and most effective tool for measuring the liquid level of fire suppression gasses including CO2, FM200, NOVEC and FE-13. Portalevel™ is a handheld product which can be used in both onshore and a model with offshore applications. With its user interface and data logging capabilities it has now developed into the most comprehensive portable tools for monitoring fire suppression systems.

In addition to Portalevel™, 18 months ago Coltraco introduced Permalevel™ Multiplex the first fully integrated system for monitoring cylinder points 24/7 365 days a year. The first commercial contract for this Permalevel™ came from the UK Atomic Energy Agency as they were looking for a safer and more efficient method for monitoring their fire suppression systems. Permalevel™ Multiplex was developed to build on the products Coltraco had to offer the most comprehensive solution possible.

Permalevel™ Multiplex is a fixed system; the ultrasonic measuring equipment is attached to the cylinder point which continuously monitors the liquid level of the suppressant gas. If the liquid level drops below the required level, the alarm sounds so that the issue can be attended to.

Permalevel™ Multiplex has the ability to monitor up to 700 cylinder points in real time; this makes it an ideal solution for large industrial facilities. One of the key advantages of real time monitoring is that it reduces down time for maintenance and improves business continuity. The operator can call up each individual cylinder point as and when required.

The system develops so much data on a real time basis Coltraco had to develop an entirely new data logging software package. The benefit of this is that it allows the maintenance operator the ability to build up a picture of an individual cylinder point. This ensures that any issues can be identified in time and the integrity of the fire suppression system is maintained.

The system has been well received since it came onto the market with companies such as Tyco UAE specifying it for projects they have worked on. Permalevel™ Multiplex is aimed at high value high risk asset owners such as power plants who are extremely safety conscious.

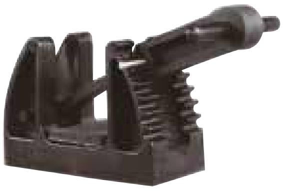
As a business, one of Coltraco's key goals is to better educate the industry in regard to the inadequacy of an annual safety check. The products and systems are designed to improve life safety and business continuity.

Coltraco has just achieved ISO14001 Environmental Management certification which is another good step for them in working towards a cleaner and greener business.

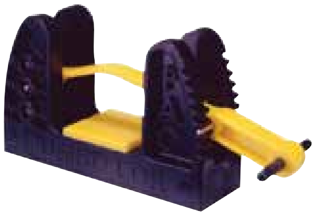
For further information, go to www.coltraco.co.uk

Supplying The Emergency Services Industry With High Quality Tool Mounting Solutions

Performance Advantage Company (PAC), develops and markets high quality tool mounting brackets. PAC'S primary market is the fire industry providing specialty tool mounting solutions for fire apparatus. Other markets include the Military, Law Enforcement, EMS, Utilities and Homeland Security. The products PAC offers are designed to mount life-saving tools safely and securely. Versatile and flexible mounting options provide the most efficient and accessible solutions for tools and equipment. Whether new or in-service vehicles, PAC products can be customized for individual needs and requirements. Many of PAC products are tested to the highest standards and are compliant with the **NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 1901** standards and **MIL-S901D** military shock specifications. If any PAC product fails under normal use it is replaced, free of charge, PERIOD! Performance Advantage Company is proud to provide the best customer service, knowledgeable sales support, and engineering and technical assistance as part of our commitment to excellence with our customers.

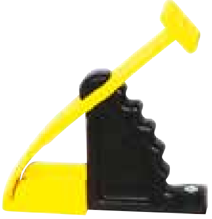


The **HANDLELOK, PN1004** provides an adjustable positive locking method to secure axes, hammers, bars and many other tools and equipment. The stretchlok strap allows quick release. The HANDLELOK is NFPA 1901-9G compliant along with Military grade B shock test certified. The high quality bracket is molded from high quality materials and is weather and UV resistant. The HANDLELOK can be mounted in numerous positions. The straps are available in three different colors; black, yellow and orange.



PAC'S JUMBO LOK, PN1070 is another great product from Performance Advantage Company. The JUMBO LOK is a large positive locking bracket with THREE strap pivot positions providing an extensive grip range for a wide variety of tools and equipment. Molded from high quality materials, and a soft textured pad for extra grip, the JUMBO LOK is also weather and UV resistant and can be mounted horizontally or vertically. The JUMBO LOK is NFPA 1901-9G compliant and Military Grade B shock Certified with a high strength strap rated above 5400psi.

The **FASTLOK KIT, PN K5020** may be our most versatile bracket ever and one of the newest items in our line. For securing larger and heavier items, the FASTLOK KIT easily and quickly secures equipment, even with gloves on. Featuring a Mini-Dual track base, FASTLOK KIT provides fast setup and adjustment to effectively mount a wide variety of equipment. Patented and certified to NFPA 1901 standards, this kit is easily re-adjustable, no metal to metal contact and UV resistant. The FASTLOK KIT is also available in an extended strap length version with a larger grip range. The FASTLOK is ideal for: Fire extinguishers, Air cylinders, Hydraulic pumps, Rescue tools, Chain saws, Oxygen cylinders and much more!.



PAC'S TOOLOK, PN1003 is a small bracket with big performance! NFPA 1901-9G compliant along with Military Grade B shock test certified,the TOOLOK is molded from high quality materials and is weather and UV resistant. The straps are available in three different colors; black, yellow and orange. The choice of fire departments around the world and the U.S. Military.

FASTLOK (P/N: K5035FL)

JUMBO LOK (P/N: K5035JL)

Another NEW PAC product for 2015 is the **Heavy Rescue Tool Mounting Kit** which supports and secures most all rescue tools including, Cutters, Spreaders and Combi tools. When used with the FASTLOK (pn K5035FL) or JUMBO LOK (pnK5035JL), heavy rescue tools can be mounted vertically, horizontally or diagonally. Features include heavy duty construction and a Lifetime Warranty.

PAC CLASSROOM, featuring "Live" product demonstrations. Our classroom offers one on one, LIVE web training and group presentations. Schedule a personal visit to our site, or PAC can host a free, live meeting over the internet. Please contact our office for more information at 888.514.0083.

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Immediate Accessibility
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The new Avlite's EMS Helipad Kit

The new **AVLITE'S EMS** Helipad Kit is ideal for medevac and other emergency situations where a temporary lit landing area is needed and can be easily configured and deployed to suit local requirements during natural disasters, humanitarian operations, emergency rescue missions or any other emergency situation.

The EMS (Emergency Medical Services) Helipad Kit is a perfect portable helipad lighting solution designed to be stowed in a helicopter for use in situations where helipad landing site lighting or mains power is neither viable nor available.

Features And Benefits

- Minimum range of 2 miles (4km).
- Autonomy >750 hours.
- Easy to configure and deploy.
- Long-life, user-replaceable battery.
- Ultra-high intensity LEDs.
- Magnetic bases hold the lights securely in place.
- Easy-to-handle case.
- Robust, high impact and lightweight construction.
- IP67 waterproof rating.
- Flashing white light with infrared provides NVG signature.
- Available in other colours and quantities making the kit suitable for other visual signal applications.

For more information, go to www.avlite.com

Zico Bracket for Dual Air Packs

ZIAMATIC CORP. (Zico) introduces the Dual Air Cylinder Bracket, Model DACB, designed to accommodate dual-cylinder SCBA and SCUBA air cylinders, with or without a harness.

Thermoplastic, non-marking, high-cycle clips can be adjusted along heavy-duty aluminum extrusions to secure a range of cylinder widths. The bracket is easily mounted to virtually any wall surface.

- Model DACB-5, with 5" clips, is ideal for use with 3.4 liter SCBA/SCUBA.
- Model DACB-6, with 6" clips, is ideal for use with 6.7 liter SCUBA.

For more information, go to www.ziamatic.com

Firemiks to Launch New Products

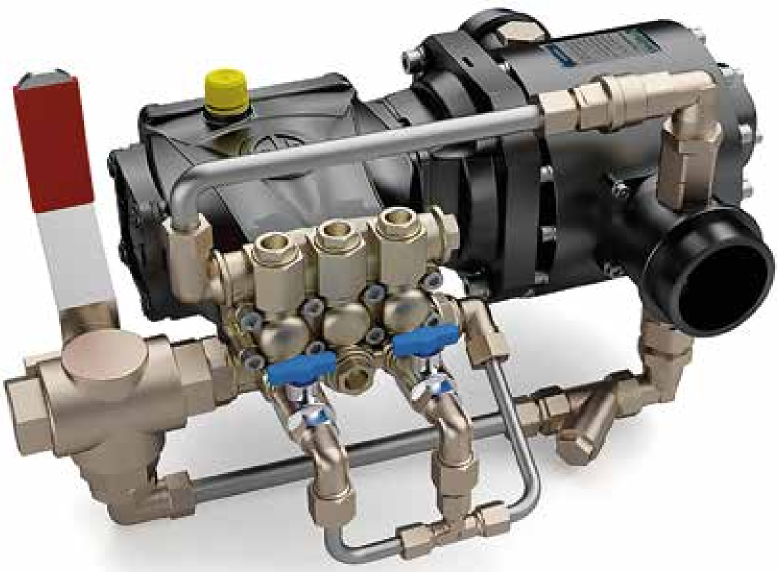
FIREMIKS AB will present several new products on INTERSHUTZ 2015, among them a new compact and handy FIREMIKS® for flow 40 – 400 lpm and with three selectable dosing rates 1%, 2% and 3%.

FIREMIKS FM 400-1-2-3-PP-F is a dosing system for fixed installations. It is a user-friendly mechanical system driven by water flow only, no need of any foreign energy as fuel or electricity, or need of creating a sensible pressure balance. Consists mainly of two volumetric parts; a Water motor and a Piston pump. Selection of admixture in 1 % steps is possible during operation and is made with ball valves.

It is easy to install, operate, maintain and test. Can be supplied with a dosing return valve to allow testing of the system without consuming concentrate, which saves costs and is good for the environment.

Available also Mobile with a carrying handle and a Marine version with water motor in bronze. An alternative model FM 400-0,33-0,66-1-PP is also available with a selectable dosing rate of 0,33%, 0,66% and 1%.

For more information, go to www.firemiks.com



PyroBubbles

New Packing Concept for Lithium-ion Batteries

Lithium-ion batteries are gaining ground. The range of possible applications is virtually endless and the future of a modern information society without them seems inconceivable. Lithium batteries are generally considered safe. The development dynamics have increased the complexity and severely changed the number of different types as well as the chemical specifications. It is common knowledge that lithium batteries potentially exhibit "high inertia". This means that several days could pass between the actual damaging event and a possible thermal runaway. Energy density, self-ignition potential, overload (severe temperature increase due to exothermal events), total discharge or the loss of electrolyte: The hidden risks may not be underestimated. Risks are particularly due to faulty usage, improper handling or errors during production. Chemical reactions of the electrolyte may also cause extremely caustic hydrofluoric acid (HF) as well as highly inflammable and partially poisonous organic connections. As the chemical reactions of the lithium cells are exothermic, it is possible that the reaction of one cell "infects" the neighbouring cells. Alexander Lehmann, Chairman at Fire-Shield I AG also describes this infectious effect of a lithium cell as a "domino effect", because it is possible that the neighbouring cells are "infected", causing the entire module and/or the entire battery to burn down; this event is called thermal runaway.

Logistics and particularly hazardous goods transport are aware of several packaging methods for critical lithium-ion batteries. With the increasing volume of lithium-ion batteries in all industrial sectors, conventional packaging methods are facing the problem that the rapidly increasing distribution of modern energy storages and their packaging shall at times only be possible under considerable expenditures. Accordingly, the objective was to create a practical standard packaging method in compliance with international regulations. The most important components of the packaging method include an approved transport container, specially positioned pressure valves, inert filler and the all-round cover with PyroBubbles to surround a defect or damaged lithium battery. The central component for the protection in case of thermal runaway is the inert filler PyroBubbles. PyroBubbles is a fire protection agent examined by the German test institute MPA Dresden in accordance with DIN EN 3-7 suitable for solid and liquid inflammable substances (Fire class A, B, D and F). PyroBubbles are extremely light (bulk density approx. 235kg/m3), has a porous surface and an average corn size of 0.5 – 5 mm. PyroBubbles is water neutral, food safe and recyclable. As PyroBubbles are chemically inert and electrically insulated, they contain the risk potential of lithium-ion batteries well.

The also withdraw a lot of heat from the runaway lithium-ion batteries as well as the released liquids and gases due to their high specific heat capacity. The porosity allows a high electrolyte absorption capacity of 2.5 l/kg and the dense "packing" around the battery inhibits material transport and allows for the condensation of vapours. The decisive criterion for its protective character is the all-round cover with PyroBubbles surrounding the defect or damaged module. The fact that batteries can be packaged quickly and safely is one very special feature of the PyroBubbles-LIONGUARD packaging system. Neither separate internal packaging nor additional measures to secure the position are required. The packaging can be used until a critical event occurred. Up to this time the system can be reused any number of times and is practically maintenance-free. Following a critical event, the box can simply be recycled. Various lithium-ion batteries, pouch cells, e-bike batteries as well as individual modules and entire battery systems up to 140 kg from the automobile sector were subjected to extensive test during numerous experiments.

The PyroBubbles-LionGuard packaging method provides packaging which complies with the regulations for the transport of critical lithium batteries in terms of a thermal runaway, which has been approved by the Federal Institute of Material Research and Testing, BAM. In this context, Alexander Lehmann states "that the PyroBubbles-LionGuard product family was expanded by a so-called Box in Box System which, for the first time, permits the collection and transport of lithium batteries with different chemical compositions, energy densities and weight in accordance with the regulations. This is the complete solution for retail trade and industry. Functioning circuits and recycling processes will contribute significantly to the safety as well as the preservation of resources in the future.

Image courtesy of Fire-Shield AG

For further information, go to www.fire-shield.de

Hainsworth the Innovator Meets Needs of Firefighters

Hainsworth has been working closely with firefighters for more than 150 years. The company dates its association with the firefighting industry to the formation of the London Fire Brigade. Since this time, the mill has been responsible for protecting firefighters, first with woollen cloth, more recently with the industry-leading TITAN fabric technology.

Tom Hainsworth

Tom Hainsworth is Managing Director of global textile producer Hainsworth.

Those who work at Hainsworth are proud of the heritage of the company, but they also recognise the importance of continuous innovation to meet the changing needs of firefighters around the world. That is why Hainsworth is looking forward to attending Interschutz in June and AFAC in September because these major industry events will allow the company to introduce a number of new innovative products to the firefighting community.

Among them will be the latest addition to the TITAN family – TITAN 1260 – which complements the existing 1220 and 1250 systems by adding flexibility after flashover with the fabric remaining flexible with minimal carbonisation, ensuring that the garment remains intact and does not break open after exposure to flame and cooling down. TITAN 1260 has successfully undergone a number of trials which have demonstrated its enhanced breathability, durability and protection.

Image courtesy of Hainsworth

The PBI, DuPont Nomex and DuPont Kevlar combination contains a specially developed yarn to provide a smoother fabric surface which reduces fibrillation and consequently improves airflow to ensure maximum breathability and comfort. It is a new offer for structural firefighting and has come about through the work of the Hainsworth Innovation Centre – a UKAS accredited laboratory – in conjunction with its partners as well as firefighters in the UK and internationally.

The research and product development carried out by the Hainsworth Innovation Centre informs the processes of the company's fully integrated, vertical textile mill which boasts its own spinning, weaving, dyeing and finishing, printing and fabric conversion machinery – a result of its history but today offering a genuine point of difference in the protective clothing market.

In Australia, further Hainsworth innovation can be seen in the tests which are currently being carried out on the company's ECO-DRY Shield technology.

As in the UK and Europe, so the Hainsworth innovation team has been working closely with its partners, which has included time spent alongside wildland firefighters who each year are faced with the challenge of tackling some of the most ferocious fires on Earth.

Hainsworth is playing a key part in ensuring that Australian Merino wool has a big future in the manufacturing of firefighter turnout gear. ECO-DRY technology, consisting of a range of solutions – both outer shell and linings – harnesses the many benefits of wool.

ECO-DRY Shield products have been specifically engineered to combine the unique properties of wool, Nomex, Kevlar and Lenzing FR. It has been woven using a unique rail system which leaves a visible stripe effect to the woven structure. The lightweight single layer construction aims to provide the wildland firefighter with mobility, flexibility, comfort and, above all else, maximum thermal protection in the most demanding of conditions.

Almost four years ago, Hainsworth launched a global marketing campaign to promote its products and the innovation it seeks to bring to the firefighting family.

Three core messages underpin the qualities the company seeks to achieve in all of its product development and were incorporated into the campaign. They are – design that saves, protection that shows and quality that lasts.

When Mark Jones, the soon-to-retire Chief Fire Officer of Buckinghamshire and Milton Keynes Fire and Rescue Service, visited Hainsworth, he asked for a tour of the mill to discover more about how the company successfully allies heritage with innovation.

Mark observed that its products are "high quality and reputable and their customer focus superb".

He added: "It is easy to see why their products remain a prolific part of so many emergency service uniforms."

Firefighting just like Hainsworth has evolved during the last two centuries and both will continue to do so over the next two hundred years.

Firefighting garments are not something you can buy off the peg. Today's firefighters are expected to perform a vast and complex array of duties – all very different depending on whether a firefighter is stationed in London, the Scottish Highlands, Scandinavia, Detroit or the Australian Outback. The introduction of TITAN technology and more recently ECO-DRY systems has taken PPE fabric intelligence to the next level.

The addition of TITAN 1260 and the ECO-DRY Shield products over the coming months ensures that Hainsworth and its partners are able to demonstrate that they continue to be in tune with the requirements of firefighters on the frontline wherever they are in the world.

Ultimately, the responsibility of businesses like Hainsworth is not merely about the weaving of fabrics or the assembly of garments. It is about ensuring that we use our collective history and our powers of innovation to ensure that the kit our firefighters wear gives them the confidence that they will return home safely to their families at the end of their shift.

Image courtesy of Apollo

For more information, go to www.protectsyou.co.uk

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PUBLIC SAFETY IN THE CENTURY OF CHANGE

In this constantly changing century, it is crucial to continuously adapt and apply a forward thinking approach in overcoming the risks and challenges facing the public safety sector. APCO presents the 12th Annual Conference and Exhibition- 'Public Safety in the Century of Change.' This event promotes collaboration and innovation and will give delegates insight on how new thinking can help organisations stay ahead of the curve. The conference and exhibition has been overhauled for 2015 and will take on a new and improved format which includes the introduction of seminar theatres to the exhibition floor and the broadening of the event to encompass a larger variety of industries and sectors. The conference program is spread over two days and comprised local and international keynotes, expert Q&A panels, two concurrent streams, pre-conference workshops and access to an extensive 3000 square metre exhibition hall. Leading vendors will showcase state-of-the-art solutions for the public safety sector and will demonstrate their capabilities in a face-to-face environment.

Please visit www.apcoaust.com to register and acquire more information about the 2015 Conference and Exhibition or write to events@apcoaust.com.au.

Partnered with:

CONFERENCE SPEAKERS

-**Jason Hutcheon**, Senior Sergeant, Tasmania Police
"Tasmania Police Computer Replacement Project"

-**Ashley Marshall**, Head of Network Solutions, Airwave Solutions
"Public Safety Radio on LTE Networks. Are We There Yet?"

-**Paul Harris**, Team Leader Local Planning, Country Fire Authority
"Communication Content is King, Context is Queen."

-**Robert Tait**, Lead Consultant, Nova Systems
"How to Successfully Introduce New Technology in Mission Critical Environments"

-**Robert Waugh**, Superintendent, Queensland Police Service
"2014 G20 Lessons Learnt"

-**Krishna Kongara**, Senior DSP & Systems Engineer and Scott Andrew, R & D Manager, Simoco
"P25 Phase 1 to Phase 2 Migration"

-**Alex Stefan**, National General Manager for Government & Public Safety, Telstra

-**David Goedecke**, Senior Solution Architect, Intergraph
"Riding the Crest of NexGen Communication Wave"

-**Jevon McSkimming**, National Manager of Mobility and Innovation, New Zealond Police

Plus Many More...

What is APCO? The Association of Public-Safety Communications Officials Australasia is the dominant body in the Asia Pacific region, representing all sectors of public safety and emergency management through communications and technology innovation. APCO Australasia is a professional not-for-profit membership association connecting government and private sector companies. APCO Australasia provides extensive networking and professional development opportunities through a range of events and communication channels.

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Neil Bibby talks with...
Dr Peter Meikle, Xtralis Pty Ltd

I sat down for a pleasant chat with Peter Meikle about where we have come from and where we are going with Aspirating Smoke Detectors (ASD) in particular the Very Early Smoke Detection Apparatus (VESDA) range of ASDS.

Dr Peter Meikle

Dr Peter Meikle is currently VP of Business Development but has occupied senior leadership roles in Applications Engineering, Strategic Marketing, Product Line Management, Solutions and Competition at Xtralis Pty. Ltd. He has over 20 years experience in developing the market for Aspirating Smoke Detector. At Xtralis Peter has been responsible for Product and Market development activity for the VESDA range of ASD systems over a period that has seen ASD evolve from a niche technology to a mainstay of the fire detection industry. Peter has spoken at conferences globally including AFAA, Fire Australia and AIM.

You may ask why is the *Asia Pacific Fire* magazine featuring a specific product. The answer is simple. VESDA was conceived, born and grew up in Australia and we don’t celebrate our successes enough. With the help of Rob Llewellyn employed with the Post Master Generals office in the early stages of VESDA and Wikipedia I have put this history together

History

In 1970 the Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO) used a nephelometer* to carry out research into forest fires, sampling smoke while flying over fires, David Packham and Len Gibson effectively used the first ASD. Subsequently, the Australian Postmaster-General’s Department (later becoming Australia Post and Telstra) engaged CSIRO to investigate technologies that could prevent service interruption due to fire. After selecting a test site to carry out research, CSIRO suggested that the nephelometer should be used as the benchmark for the fire tests. This was installed to monitor smoke levels within the return-air ducts of a mechanical ventilation system.

At the conclusion of several weeks of testing, it was discovered that there was no commercially available fire detection technology suitable for preventing damage to telephone equipment. One technology that did show great promise however was the nephelometer

▼ Beijing Water Cube protected by VESDA.

Image courtesy of Xtralis Pty Ltd

Dr Peter Meikle is VP Business Development for Xtralis Pty Ltd.

© Image courtesy of Xtralis Pty Ltd

◀ Sydney Opera House protected by VESDA.

itself. This was developed further by AWA laboratories in South Australia.

In 1979, Xtralis, then IEI Pty Ltd followed by Vision Systems Pty Ltd, produced and sold an air sampling device they called VESDA. The company redesigned the detector in 1982 to provide the reliability, features, size and reduced cost for export markets. ASD systems have gained popularity due to their ability to sense smoke long before a catastrophic incident. From 1970 the system went from an instrument the size of your desk to the mid 70s where it was the size of a suit case and then a lunch box in the early 80s. With this came significant improvements in air aspiration and the detection software.

*A nephelometer is an instrument for measuring concentration of suspended particulates in a liquid or gas colloid. A nephelometer measures suspended particulates by employing a light beam and a light detector set to one side (often 90°) of the source beam.

Why ASD?

ASD design corrects shortcomings of conventional smoke detectors by using sampling pipe with multiple holes. The air samples are captured and filtered, removing any contaminants or dust to avoid false alarms and then processed by a centralized, highly sensitive laser detection unit. If smoke is detected, the systems alarm is triggered, and signals then are processed through centralized monitoring stations within a few seconds.

Unlike passive smoke detection systems including spot detectors, ASD systems actively draw smoke to the detector through bore holes within a piping system that runs throughout the protected area. ASD systems incorporate more than one level of alarm, generally configurable. This allows an ASD system to provide very early warning of an event, prompting investigation at the earliest smouldering stage of a fire when it is easily addressed. Other alarm levels may be configured to provide fire alarm inputs to fire systems as well as releasing suppression systems. ASD alarm sensitivities are configurable and can be programmed to levels ranging from thousands of times more sensitive than a conventional detector, to much less sensitive. The detectors work best in non-volatile environments. They can also be used in computer cabinets to alert users to the overheating of computer cables or individual computer components.

ASDs are suitable for environments where a highly sensitive rapid smoke detection capability is required. This makes them suitable in clean rooms; areas which contain goods easily damaged by fire, such as tobacco smoke, electronic rooms and highly flammable liquid and gases. Often, normal point detectors will recognise the danger too late, as smoke often does not reach the ceiling quick enough for a fire to be detected in a timely fashion.

As they can be easily hidden, pipe networks are suitable in environments where point detectors can be considered aesthetically displeasing, such as offices, apartments and hotel rooms. This factor also makes them suitable in locations where point detectors can be easily tampered with, such as in correctional facilities.

Despite their high sensitivity ASDs can be used in dusty or dirty environments as long as correct design, installation and maintenance processes are followed. Most ASD products can accommodate a broad range of environments and applications – from both confined and open spaces to the cleanest or dirtiest environment, including telecomm, control rooms, waste treatment, mining and more.

Where do we go with ASDs in the future, Peter?

Aspirating smoke detection is the fastest-growing detection area, and we are the fastest-growing company in that area. We will continue to exploit our existing technologies, and we have a number of others in the pipeline that are just as important. We will be further developing our VESDA-E platform to try and further work out the best ways of extracting and presenting the data it produces. We want to turn something that in the past has been a grudge-buy into something that actually provides real return on investment.

Market share in China is up to 80% – Why?

There are two aspects to that. Firstly, we have been present in China for quite a long time and we have gone to the trouble of having our products approved to the local codes and standards. We have also worked with various design institutes to perfect our offering for various applications. The design authorities tend to be separated into vertical markets. They have criteria for specific design applications, which we have had to adhere to. There are also the over-arching standards like CCCf that we have secured for our products as well.

Secondly, we have a second,

indigenous brand specifically in China that we acquired several years ago, called FMST. This exists because there are particular commercial pressures in China that need to be met, and there is also a desire for local content. Having the dual brand strategy, combining our worldwide VESDA brand and the local, market-leading, FMST means Xtralis has the two leading brands in that market.

What innovation can we expect for Xtralis?

The latest innovations in Xtralis smoke detection provide accurate Very Early Warning(VEW) of fire events in the presence of high levels of nuisance alarms sources. Being able to distinguish between substances such as dust, smoke, and diesel, could considerably reduce the time needed to accurately identify, verify, and deal with an incipient event, mitigating loss. Similarly, the ability to "fuse" data, such as the presence of smoke, different gas species, would be a valuable decision support in emergencies. Reducing nuisance alarms is essential to enhancing or restoring the effectiveness of responders who are consuming valuable resources attending nuisance alarms.

Addressability is a useful attribute of a fire system however there has always been a trade-off between Early Warning (EW) and addressability. Addressability combined with VEW is another new innovation. ASD systems with addressability to up to 120 detection points will be able to provide VEW of the exact location of an incident in facilities such as high-rise buildings, educational campuses and hospitals, aiding evacuation, and minimising loss and downtime. These systems provide cost-effective VEW addressable detection with superior performance, utility and reduced operational expenditure. In addition, earlier and specific warning enhances situational awareness.

Decision support, response and remote diagnostics are aided by advancements in wired and wireless communications allowing off-site monitoring using Ethernet connections or mobile applications. The combination of specific, enriched and aggregated data, very early warning and improved connectivity enables integration of intelligent detection to building management and other systems, including remote monitoring and verification, such that data from a multitude of sources can be used to create true, actionable information on threats as well as providing input to Building Management and other occupant comfort, and energy saving systems.

Summing Up

All of this came from a couple of CSIRO scientists in a plane over forest fires sampling smoke in the early 1970s combined with a need to protect our telecommunication systems from fire and get early warning of a fire in its incipient phase. From this small start a significant industry has grown in our region. Today ASD technology has gone mainstream and is widely accepted by industry experts and players. Applications continue to grow as the world becomes more conscious of fire safety standards.

For more information, go to www.xtralis.com

VESDA® Ξ™

Sets a new standard for superiority.

With over **850,000 systems** already in more than **350 applications** around the world, it's no wonder why IHS Technology reports Xtralis as the leading supplier for aspirating smoke detectors globally. If you're not specifying **VESDA**, why not? – find out what other specifiers already know.

To learn more schedule a **Lunch & Learn today** at www.xtralis.com.

IHS Technology

The World Market for Fire Detection and Suppression Products - 2014 Edition

According to IHS, for the 8th consecutive year, Xtralis is the largest aspirating smoke detection company in the world. **And the fastest Growing.***

*From the latest IHS Technology report titled "The World Market for Fire Detection and Suppression Products – 2014 Edition."

Primetech – Pioneers in Communication

The launch of Primetech's innovative new MultiNet Comms range of portable incident ground communications solutions will help answer a real need among emergency services for better incident ground communications, helping them improve their response to major public safety threats such as wide area fires, floods and fast moving terror attacks.

Henry Walker

Henry Walker is a Director of Primetech (UK) Ltd.

Primetech's new range will also complement and build on a number of other unique technologies and flexible, agile platforms that the company has developed for improving emergency communications and operational command. These are highly relevant to the Australasian market, as mobile satellite broadband and other solutions can help overcome the communications problems caused by terrestrial networks being burnt out during fast moving wild fires, such as occurred during the Black Saturday bushfires in 2009.

UK mobile satellite broadband and communications developer and integrator Primetech has, over the past decade, built a growing reputation for developing and implementing advanced communications solutions. It supplies Ka-band mobile satellite broadband and other integrated communications systems, such as High Definition video and incident ground WiFi, to fire, police, ambulance and other public services on a wide variety of platforms, from major Incident Command Units to more mobile Resilient Communications Trailers and ute-style vehicles such as the Mitsubishi Trojan and Land Rovers.

Now, with the launch of its new MultiNet Comms family of modular, portable integrated incident ground communications solutions, combining video, voice and internet access over 2.4 and 5.5 GHz COFDM-supported WiFi and 3G/4G, plus private cellular networks, the company has made another major leap forward, demonstrating once again its commitment to supplying emergency services with some of the world's most advanced operational communications systems. Such systems support enhanced situational awareness and improved multi-agency interoperability.

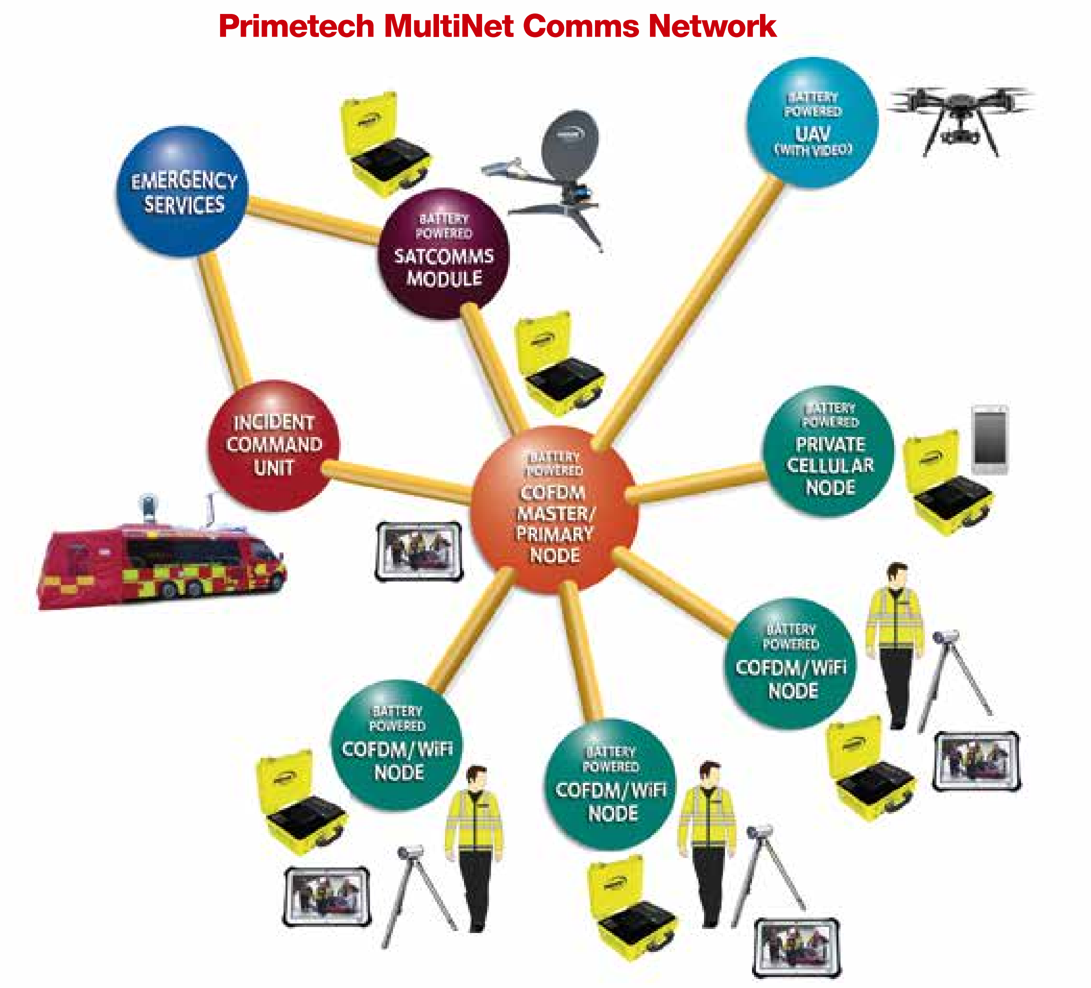
Emergency services around the world need high capacity, joined up and flexible communications to support them in their work, whether it is in fires, flooding, Urban Search and Rescue, firearms incidents, terror attacks or rail and road accidents.

Common issues impacting on the effectiveness of emergency response were identified in the various papers presented as part of the UK's Joint Emergency Services Interoperability Programme – JESIP (now Principles), with specific incidents and 'lessons learned' evaluated, as recorded in post-incident enquiries and reports.

Sadly, there was a wide selection of incidents that could be referred to, but the more recent ones included: the 2004 ICL Factory Explosion; 2004 Boscastle Floods; 2005 Buncefield Oil Depot Explosion; 2005 London Terrorist Attacks; 2005 Stockwell Shooting; 2005 Carlisle Floods; 2007 Hull Floods; 2007 Pitt Review (UK Floods); and the 2010 Derrick Bird Shootings. Other major incidents referred to included the 1987 King's Cross Underground Fire; the 1987 Hungerford Shootings; the 1988 Piper Alpha Explosion; the 1988 Clapham Rail Crash; the 1988 Lockerbie Bombing and the 1989 Hillsborough Stadium disaster.

In the past, as the JESIP working documents acknowledge, poor communications and organisational problems have often been the causes of ineffective multi-agency emergency management response. The consequences of such mistakes, involving many people's lives, incomes and property, can often be catastrophic and linger on for decades.

The active training and education phases of the Joint Emergency Services Interoperability Programme (JESIP) are now winding down. Around 10,000 staff from


Primetech MultiNet Comms Network
EMERGENCY SERVICES
BATTERY POWERED SATCOMMS MODULE
BATTERY POWERED UAV (WITH VIDEO)
INCIDENT COMMAND UNIT
BATTERY POWERED COFDM MASTER/ PRIMARY NODE
BATTERY POWERED PRIVATE CELLULAR NODE
BATTERY POWERED COFDM/WiFi NODE
BATTERY POWERED COFDM/WiFi NODE
BATTERY POWERED COFDM/WiFi NODE

The Primetech MultiNet Comms network modules are housed in Peli cases, providing mobile satellite broadband communications support for UAV live imagery, body-worn, tripod and other ground based imagery feeds, plus wide area 2.4 and 5.5 GHz COFDM-supported WiFi, 3G/4G communications and a private cellular phone network. They can also support life signs monitoring, and are powered by light, powerful batteries and swappable back-up battery packs.

▲ **The Primetech MultiNet Comms modules are housed in Peli cases, providing mobile satellite broadband communications support for UAV live imagery, body-worn, tripod and other ground based imagery feeds, plus wide area 2.4 and 5.5 GHz COFDM supported WiFi, 3G/4G and private cellular network communications. They can also support life signs monitoring, and are powered by light, powerful batteries and swappable back-up battery packs.**

▲ **The highly portable and self supporting Primetech MultiNet Comms range has been developed in response to requests from emergency services for incident ground communications solutions that are not dependent on being housed in Incident Command Units, of whatever size.**

across the UK emergency services have participated in training courses designed to improve multi-agency communications, cooperation and operational effectiveness during large and complex incidents. Soon the word ‘Programme’ in the title will be replaced by ‘Principles’, to sustain the work done and to reinforce the lessons learned.

Two key issues highlighted throughout the JESIP papers (and the post-incident reports examined) were Operational Communications and Shared Situational Awareness, areas where in the past there have often been problems. Improved use of communications was one area focused on in the JESIP training and exercising sessions, with particular emphasis on the use of Airwave (TETRA).

But radio is now only one of many options on the menu of communications options available to emergency service commanders; other, complementary, communications options are now available.

In fact, the communications solutions currently available to emergency services have never before been so powerful. Emergency services can now gather and share key incident ground information using live-streamed, High Definition video imagery, and share command information using ruggedised tablet and laptop computers linked by wide-area WiFi.

This can all be done in real time and across different command levels of individual services, as well as shared with other emergency services, Cat 1 responders and combined headquarters, such as Local Resilience Forums (and even COBRA, the central government emergency command HQ in London).

Rather than endless descriptive radio chatter and clutter, with the risk of overload, confusion and inaccuracy, commanders can now see with their own eyes what is happening down to individual sector level (the improved Situational Awareness identified as a key priority), and then make better-informed multi-agency decisions.

Mobile Ka-band satellite broadband, including Primetech’s new MultiNet Comms family of modular, battery powered, wide area communications, combining COFDM-supported 2.4 and 5.8 GHz WiFi, 3G/4G wireless solutions, UAV imagery and private cellular networks, plus supporting technologies, are what make this new level of video transmission possible, in particular the new, higher bandwidth Ka-band standard. The MultiNet Comms units are powered by light, powerful batteries and housed in rugged waterproof peli cases.

The Primetech MultiNet Comms

range has been developed in response to requests from emergency services for communications solutions that are not dependent on being housed in Incident Command Units, of whatever size.

Large mobile Incident Command Units are still needed to manage many emergency situations, however, and Surrey Fire and Rescue Service's new ICU, supplied by Primetech, is probably one of the most advanced ICUs in the world, featuring Ka-band mobile satellite broadband and High Definition incident ground video imagery (an industry first). It was this range of features that helped it deliver outstanding performance during the large-scale Thames Valley floods in early 2014.

Under very difficult conditions, the service was able to deliver very high levels of satellite broadband command communications, both for itself and for all local emergency services. Using Primetech's C-Com satellite receivers and the Ka-band channel, the service was able to provide high levels of mobile satellite broadband capacity for emergency command teams from all local emergency services and agencies.

Surrey FRS's new ICU was deployed to its Chertsey station (a few miles south west of Heathrow), which was the incident joint forward tactical operating base for around two weeks in mid-February 2014, during the height of the flooding crisis.

Based in the station's car park, and connected into the main building, it was able to provide previously unobtainable levels of satellite broadband communications capacity in support of command and field teams from the fire service itself, along with police, ambulance and other agencies, the local authority and volunteers, as they battled to help local communities.'

Rory Coulter, head of logistics at Surrey FRS, observes.

'Ka-band gave us a much better broadband capacity than we could achieve within the station. But it wasn't only us using the station, it was all the other agencies – the police, the HART teams, the local authority, plus volunteers. The station became the hub of everything for our area of the river Thames. We wouldn't have been able to provide the level of information transfer which they achieved without the Ka-band communications systems of the ICU vehicle.'

Swaledale Mountain Rescue has successfully completed trials using Primetech's mobile satellite broadband to support a new multi-site Digital Mobile Radio (DMR) network comprising a number of base stations and terminals. The Ka-band satellite system is being used to address a broadband black spot in one of the sites, which previously had little or no coverage.

Black spots are a major issue for any rescue team, as volunteers rely heavily on mobile technology to communicate with each other during emergencies. (Swaledale Mountain Rescue is a volunteer service providing mountain and cave rescue services within the Swaledale and Wensleydale areas of North Yorkshire).

Another emergency responder which has adopted Primetech's Ka-band mobile satellite broadband is Northumberland National Park Mountain Rescue Team (NNPMRT), a volunteer service providing mountain and cave rescue services within Northumberland.

Both the Swaledale and Northumberland teams are made up of highly trained volunteers who are available to be called out (at short notice) for a variety of land based search and rescue operations, any time day or night.

▶ Primetech's Rapid Response Multi-Role Vehicle, on Mitsubishi Trojan, Land Rover and other platforms, can deliver HD video, WiFi and voice comms in less accessible areas.

▼ Primetech's highly portable Resilient Communications Trailer delivers high bandwidth Ka-band mobile satellite broadband capability, plus 2.4 and 5.5 GHz COFDM supported WiFi, 3G/4G mobile and radio into any location, such as schools and office buildings.

Ka-band mobile satellite broadband provision doesn't need to be located in a big ICU format like Surrey FRS's. Primetech's Resilient Communications Trailer is a self contained, flexible, resilient and highly portable communications unit that we have developed to deliver high bandwidth Ka-band capability, in any location, via an auto-seeking C-Com receiver system, with multi-VPN automatic 3G/4G failover and wireless communications from a 5-metre pneumatic mast.

The trailer allows mobile satellite broadband and wireless comms to be taken into sites not easily reached by larger mobile command vehicles. Use of the trailer frees up larger command vehicles, essential during large-scale, wide-area, multi-site and multi-agency emergencies.

It provides a low cost 'force multiplier' to boost emergency services' communications capabilities and resilience.

With extension cables the trailer can be used at sites such as schools, community centres and office buildings, when major emergencies require short or long-term communications capability.

Mobile satellite broadband is also available as an option on the Primetech Rapid Response Multi-Role Vehicle, on Mitsubishi Trojan, Land Rover and other platforms.

For more information, go to www.primetech.co.uk

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The focus of the conference will be better integration to more effective search and rescue operations. The program will reflect just how much the search and rescue world has evolved, tackling issues ranging from the latest requirements for airborne search and rescue assets through to the latest in innovative life-saving training and techniques.

DISASTER & EMERGENCY MANAGEMENT

The **Australian & New Zealand Disaster and Emergency Management** Conference will be held at Jupiters Gold Coast on the 3rd - 5th May 2015. The Conference will continue our support for the Disaster and Emergency Management community. You are invited to join us as we focus on natural disasters with the conference theme of **"EARTH; FIRE AND RAIN".**

The Conference will feature multi-agency presentations covering all phases of emergency and disaster management – prevention, preparedness, response and recovery. There will be representation by fire, ambulance, emergency, rescue, volunteer, defence and health sectors.

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Online Forums Showcase Bushfire CRC Research

Hundreds of participants from across the emergency management sector, both in Australia and internationally, have participated in the Bushfire CRC's Research to Drive Change series of online research forums.

Brenda Leahy

The series presented the findings of the Bushfire CRC's research program (2010 to 2014), delivering scientific insights into ways of making both communities and firefighters safe, as well as vastly improving forecasting and modelling. Other topics in the series included community safety, ecology, incident management and economics to aid decision making.

Each of the forums involved a documentary style video summarising the research findings, together with a Fire Note and in-depth research reports. These resources, together with a complete video of each forum, are available on the Bushfire CRC website for replay and downloading.

One of the first forums covered Next Generation Fire Prediction. Held in May, it proved to be one of the most popular, with more than 120 people logging in on the day to join the researchers for the interactive webinar.

The collaborative research project produced the Fire Impact and Risk Evaluation Decision Support Tool (FireDST), a proof of concept simulation system that aimed to provide critical fire planning information to emergency services, government and the public. FireDST is an advanced software program that could be used to understand the potential impacts a bushfire may have on community assets, infrastructure and people. FireDST demonstrates the ability to predict the probabilities of both neighbourhood and house loss, as well as the potential health impacts of bushfire smoke and the areas that are likely to be affected by a bushfire.

The Paying the Price forum featured research that investigated the role of economics in the management of bushfire strategy and its execution.

Case studies of integrated assessment of fire risk management strategies in New

▼ **Research investigated the economics of prescribed burning with case studies in South Australia and New Zealand.**

Image courtesy of www.bushfirecrc.com

Brenda is Communications Officer at AFAC Research Utilisation. She held a similar role at the Bushfire CRC and moved when the Bushfire CRC's research utilisation function transferred to AFAC in 2014. You can contact Brenda at Brenda.leahy@afac.com.au

Zealand's Central Otago region and South Australia's Mount Lofty Ranges were used to demonstrate how fire-prevention strategies could provide value for money.

A decision framework was developed to provide an integrated assessment of the benefits and costs of fire risk management strategies. The study highlighted fire risk management strategies (including prescribed burning) that were likely to produce the highest benefit for each dollar spent. The methodology offers valuable decision-making inputs into fire management programs.

Also discussed was the use of economic decision-making processes within fire and land management agencies. The research showed that economic evaluation was a useful tool for bushfire management, but remains under-utilised within agencies. A number of key actions were identified to increase the use of economic evaluation methods. These included increasing economic expertise among bushfire management and policy professionals, and designing economic evaluations that connect to the broader social and political context of bushfire management decision-making.

The concept of shared responsibility and broader implications for legislative, policy and planning processes were examined in the Power to the People forum. More than 90 participants logged on for the event. The aim of the research featured in the forum was to develop a deeper understanding of shared responsibility and the role of planning, policy and legislative processes as key drivers of change in risk management. The research also investigated emergency management policy and law, as well as urban planning and its role as communities expand into the rural/urban fringe.

The role and scope of communication in bushfire preparedness and response was the focus of the What Are You Telling Us? forum. It explored ways to engage communities and individuals living in fire-prone areas in community safety initiatives.

The researchers, led by RMIT's Professor Peter Fairbrother, examined the complexities of how people in these different localities organised and operated. The study investigated their formal and informal networks, and how individuals and groups within these 'social networks' related and communicated with each other, as well as with emergency services agencies.

The researchers suggested that communication should be interactive and tailored to the complexity and diversity of each locality to have lasting and measurable impact. That diversity included a broad range of factors, such as differences by locality, class, economics, ethnicity, gender and age.

Living on the Edge was another forum, which attracted more than 90 participants to join the live conversation about perceptions and reality of risk in bushfire prone communities.

Professor Ross Bradstock (University of Wollongong) and Associate Professor Ruth Beilin (University of Melbourne), together with industry representative, Mike Wouters, of South Australia's Department of Environment, Water and Natural Resources, detailed extensive research findings on householder perceptions of fire risk and how these shaped bushfire preparedness.

Professor Bradstock's research indicated that people living in fire-prone areas recognised fire risk, but may have treated it as a lower priority than other lifestyle values and factors, such as lack of time, cost barriers and aesthetic quality.

Dr Beilin's study provided a 'mud map' mechanism for householders to visualise and reflect on the fire risk in and around their properties so they could take action. The technique could be a useful tool for community safety educators to talk to people about fire risks, identify ways to safeguard their properties and increase their chances of surviving a bushfire.

Fire and its impact on water, air and land featured in the Fire in the landscape forum. The forum turned the spotlight on the findings of four key projects by University of Melbourne and University of Sydney researchers on the impact of fire on water quantity and quality and the changing nature of carbon stores (above and below the ground). The first two studies focused on the role and impact of planned and unplanned fire in water quality and quantity from catchment forests in south eastern Australia. The other two concentrated on the quantification of carbon losses during fire, a key issue emerging from climate change and increasing greenhouse gases within our atmosphere.

Image courtesy of www.bushfirecrc.com

▲ **The firefighter health and safety forum discussed research on firefighter health and safety by designing a circuit that simulated tasks conducted on the fireground.**

Other forums in the series were Thinking Under Fire, Awake Smoky and Hot!, and Beyond the Incident.

Thinking Under Fire investigated how people behave and make decisions responding to stressful conditions such as the threat of bushfire. Awake, Smoky and Hot! examined health and safety issues for frontline emergency management workers, including the impact of toxicity from fire emissions. Beyond the Incident investigated information flow, communication, capacity to adjust to emerging scenarios, breakdown in coordination, training and education and how changes to these elements will support more effective incident management.

The Bushfire CRC has now concluded, but embedding the research findings into agency practice continues through the research utilisation function at AFAC.

For more information, go to www.bushfirecrc.com

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Beware of Counterfeit Fire Detection Devices

There can be fewer product categories where the consequences of using counterfeit goods can be as potentially catastrophic as that of fire detection equipment. Although the reported cases of imitation detectors are thankfully rare, the potential risks should never be underestimated.

Paul Pope

Paul Pope is Business Innovation Manager – EMEA for Apollo Fire Detectors.

So, how can customers take steps to ensure their fire detection products are the real deal, and avoid the dangers of fake devices, and what are the crucial testing processes that legitimate equipment must undergo?

One of the most notorious cases of counterfeit fire detectors took place in Atlanta, USA in 2011 where over 18,500 fake smoke detectors, which had been handed out free to low-income neighbourhoods by the Atlanta Fire Rescue Department, were recalled following an FBI investigation. Whereas this example undoubtedly falls into the rare category, it serves to highlight not only how even the most experienced of organisations can be easily tricked into buying counterfeit fire detectors, but also the extensive possible risk to human life.

When it comes to fire detection equipment, the rigorous design process, validation testing, testing before and during production and ongoing quality checks that authentic professional companies carry out is key to the reliability of their life safety products. Counterfeit products may, to the untrained eye, look identical, but no copycat product will ever benefit the end user in terms of protecting and saving life as well as one which has been through the meticulous testing procedures of a genuine and reputable fire detection manufacturer.

If we take the testing procedures at Apollo as an example, the attention to detail in this rigorous process becomes clear.

Testing Times

During and after the design process, the products are subjected to the most comprehensive testing and validation procedures to ensure performance and reliability to real life conditions is achieved. Apollo's site in the UK includes five test laboratories, which put every piece of equipment through its paces, not only as part of new product development, but also as ongoing quality control. These different laboratories, with state-of-the-art equipment, cover every possible replicable

Image courtesy of Apollo

scenario a product may encounter, from extreme environmental conditions to harsh electrical and radio interference.

The fire testing laboratory allows products to be tested in varying fire conditions, with the conditioning testing offering tests against a wide variety of different conditions, including fluctuating temperatures, humidity, vibration and shock.

The performance and verification laboratory comprises large scale heat, smoke and gas tunnels and the electro-magnetic compatibility (EMC) laboratory tests against a variety of factors such as noise, interference, static and lightning strike conditions. Finally, the audio and visual (AV) laboratory is used to test the performance of notification devices to exacting standards. This includes the use of a Hemi anechoic chamber, a room designed with a solid floor to completely absorb reflections of sound to eradicate noise distortion and simulate a quiet open-space of infinite dimension.

The combination of these five laboratories results in a highly stringent testing process where products are not only tested to exceed European regulations, but also the approval requirements of every country to which products are supplied. Apollo, for example, holds in excess of 3,000 product approvals worldwide as well as a number of internationally recognised quality and environmental awards. Such is the strength of the test facilities, that Apollo is one of only a few manufacturers able to perform the majority of EN54 product standard tests.

Once the testing stage is complete, a product will proceed to the third-party testing stage for the appropriate certification, for example EN54, before heading to manufacture. The whole testing process can take anything from three to six months for a manual call point, to up to two years for a new fire detector. We then proceed to initial product manufacture where we will continue to stringently test every new product batch until we have 100 percent confidence. Manufactured products are continually tested, through both regular random sample testing and full annual product audits.

Because reputable manufacturers design, make and test their products from scratch, they can often ‘go back to the drawing board’ to address any viability issues that arise. Because counterfeit products are not based on this detailed design and testing process, imitation device manufacturers cannot ever pay this level of attention to detail to their products.

Image courtesy of Apollo

The Risks and How to Avoid Them

The two main dangers of counterfeit fire detection equipment are firstly, their non-compliance with industry standards, and secondly, the potential for non-compatibility within an overall fire detection system. In a situation where every single piece of equipment, no matter how small, contributes to the safe and effective working of a fire detection and alarm system, the consequences of failure due to counterfeit elements could be devastating.

To avoid these risks, the supply chain needs to take steps to ensure that the products it is supplying and installing are reliable and fit for purpose, particularly if they are dealing with a new or unknown supplier. The authenticity of fire detection and alarm equipment should never be taken for granted and should always be verified at source. At Apollo, for example, we publish all of our part numbers as well as their relevant certification and we are always happy to answer enquiries relating to a product’s validity.

Checking the product certification is the first step in ascertaining a product’s authenticity. At Apollo, the back of each of our devices displays not only the product number, but also the individual approval logos and relevant certification numbers that can be checked with the governing body concerned.

But what if a counterfeit manufacturer copies these logos and product numbers? Even the small details can give the game away: Counterfeit manufacturers may try and reduce costs wherever they can, and this reduction of quality often shows in their products. If you place a genuine fire product next to a fake one, there are a number of differences that can often be seen. An example of these differences includes the grade (quality) of materials, and therefore the colour of the plastics used. If the investigation is taken to the next level by dismantling a counterfeit product, you may see a marked difference compared to the original. Counterfeit products often use old technology with low cost boards and lots of copper compared to the modern layered boards used today.

Other differences include details such as the quality of the labelling, and even the fact that the font on the labelling may look ‘cheap or different’ – all signs that the products may be an imitation.

All of these pointers are valuable, but what if you are new to fire detection and alarm products, or have no genuine product against which you can compare?

The advice that we give would be to always use a reputable distributor or supplier, do your background research by looking at a company’s website and checking your device against the images and certificates shown and to use your common sense when it comes to price. Cost will almost always be the strongest indication when it comes to looking out for the warning signs of counterfeit products, so if a product appears too cheap then it is worth making additional checks. If a products price is too good to be true, it usually is.

Independent Certification

LPCB provides the independent, third-party certification of fire and security products and services worldwide and Apollo has been working with them for many years. Speaking about the issue of counterfeit fire detectors, LPCB International Business Development Manager, Tony Dodkin, says: “The certifications that LPCB carry out give independent confirmation by an expert third- party that a product, system or service meets, and continues to meet, appropriate standards. Certification gives suppliers and purchaser’s confidence that products and services will perform as expected – through a combination of regular company audits and a schedule of ongoing auditing.

He continues: “Our certification work in the fire detection industry sees us not only examining and certifying a new end product, but also carrying out factory inspections at manufacturers’ premises, random product audits and equipment checks. We do receive requests from installers and distributors questioning the validity of new products that they are looking to install or stock or checking that certification numbers are authentic, and we welcome this level of vigilance. As well as checking directly with us, anyone wanting to check a genuine approved product can search the industry “red book” – an online resource (redbooklive.com) that lists all certified manufacturers and their products. All users need to do is type in the certificate number and they can see a description and any additional testing details.

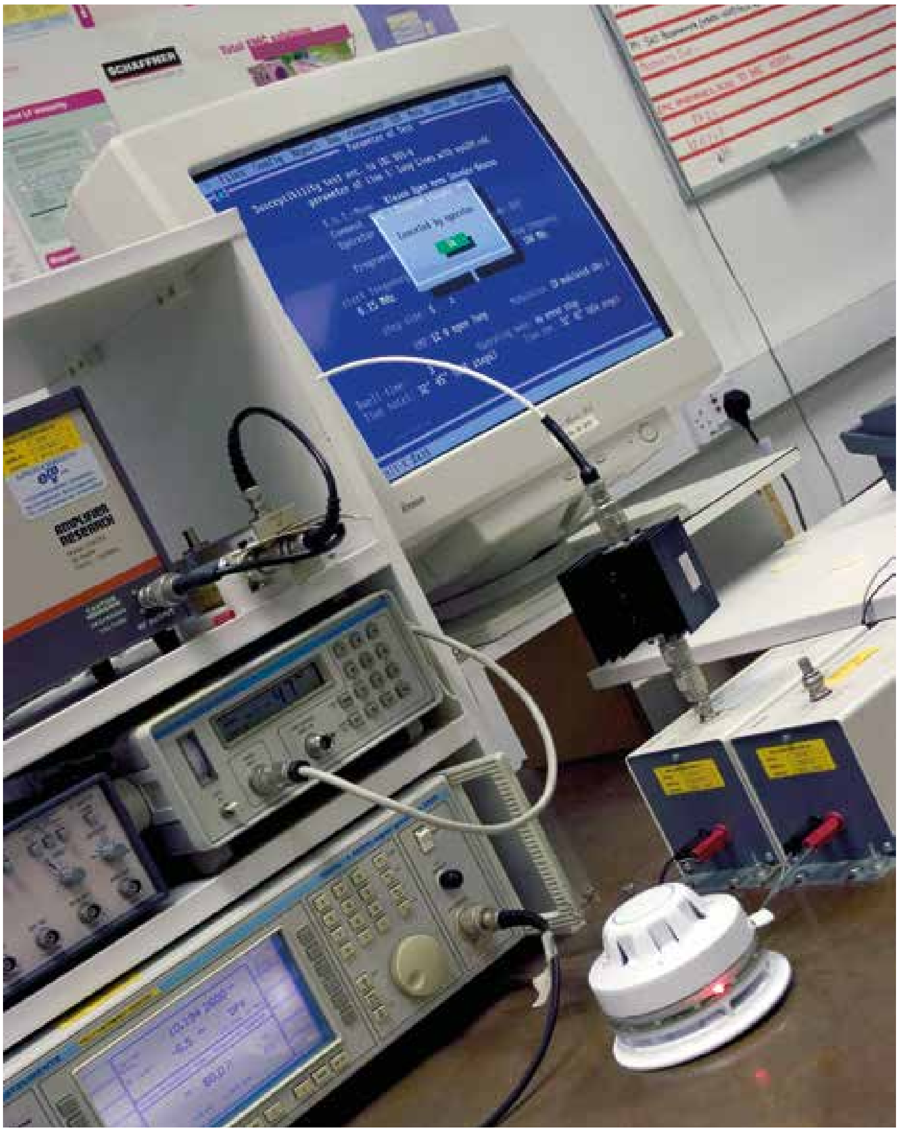

Image courtesy of Apollo

He concludes: “The fire detection industry is often perceived as one which is slow moving in terms of new technology, but there is no doubt that it is also one of the most driven in terms of industry standards and legislation. By taking advantage of checking a product against these many certifications, people can avoid the pitfalls of counterfeit devices.”

Conclusion

Going back to the example of the Atlanta Fire Department, we can see how even simple checks can protect against counterfeit devices. Part of the investigation into the supply of the fake devices discovered that a simple five-minute Internet search looking at the federal Excluded Parties List System would have revealed that the counterfeit supplier, Silver Sails, was banned from doing business with the federal government.

As a result of the case, the City of Atlanta implemented a new policy as part of its procurement process to check the background of every company that bids on goods in Atlanta, not just the fire department, and also requests samples of all products to check their validity.

At Apollo, we cannot stress enough how crucial it is for purchasers to take this level of responsibility to ensure that they are installing and maintaining an authentic fire detection product and one that is fully warranted. A true manufacturer’s product will, above all else, protect and save lives, and any building owner has the significant responsibility to customers, staff or whoever uses their facilities to ensure that this responsibility is taken seriously.

For further information, go to www.apollo-fire.co.uk

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PPE/PPC – The Last Line of Defence

In my last article in this series of Last Line Of Defence, I wrote about 'Ensemble Thinking' and the important issues of compatibility of different items of PPE/PPC. This becomes very useful when trying to identify the most vulnerable component or item of PPE.

Mark L. Gribble

Mark L. Gibble is a member of the International Standards Organisation (ISO) and Standards Australia representative for firefighting PPE.

Often this comes from a different item of PPE which is designed to provide protection from a different hazard to a different part of the body. A good example of this is in a structural firefighting ensemble, where the coat and pants primarily, but not exclusively, are designed to protect the firefighter from heat and flame exposure, while the SCBA is primarily, but not exclusively, designed to protect the respiratory system.

There is much work being done in Europe on the "Flame Engulfment and Drop Test" for Respiratory Protection Devices (RPD). Historically this ISO committee has been formed from a broad industry base and is a separate committee to ISO TC 94 SC14 for Firefighting PPE. We have had a liaison member reporting the progress from the RPD SC15 committee for some time. They deal with the safety standards for all the different types of devices across industry in general, that protect the respiratory system including SCBA, Powered Air and Filtered devices. Given the critical nature of this life support system for Firefighting, it is paramount that international safety standards are comprehensive and commensurate with the risk of our firefighting industry.

The past experience of melted components or harness strap failures, has led standards bodies to refine the "Flame Engulfment and Drop Test". Case studies of harness failure after flame and or heat exposure, has seen the potential for the weight of the cylinder dislodging the mask, which could lead to just one breath of super heated air into a firefighters airway, with a potential tragic result.

Many of the rigorous tests on Firefighting RPD's will ensure that we remain well protected. Part of the current testing is to not only look at challenging

Image courtesy of Tencate

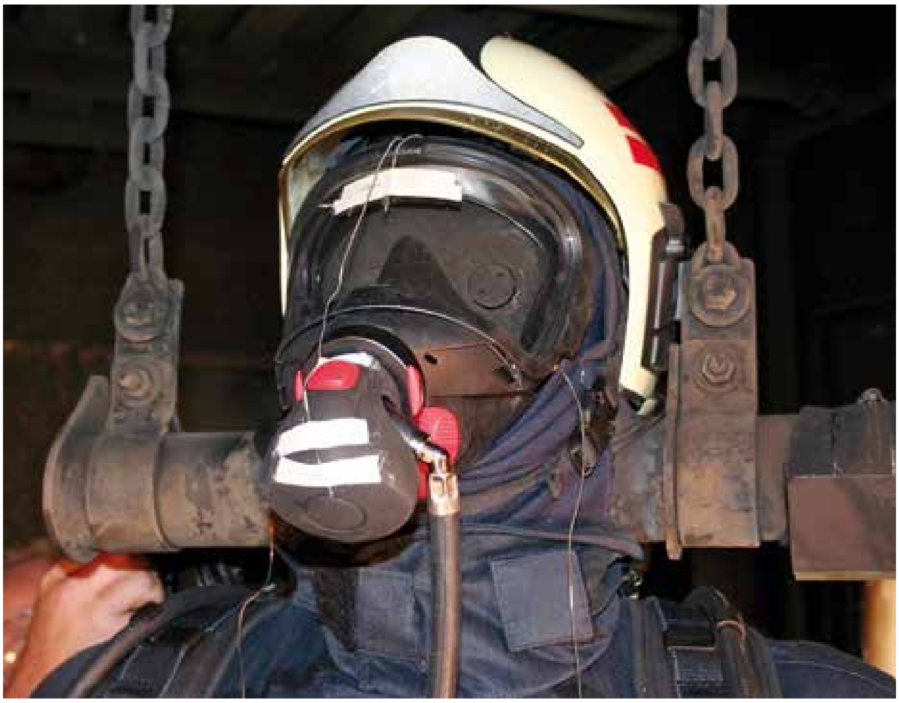

Image courtesy of Mark Gribble

Image courtesy of Bristol Uniforms

the various components which make up an RPD, but to ensure that it continues to supply air to the firefighter post exposure.

Some of the recent work in Geneva has seen a range of refinements to the “Flame Engulfment and Drop Test”. The B/A is donned onto a torso and head form, which records breathing. The operating B/A set travels along a rail into a heated compartment as a pre-treating test and is then returned to the burner area, where it is engulfed in flames. After this envelopment is completed, it is sharply dropped vertically on a slide, to test the security of the components, particularly the harness.

Tests so far have seen leading brands of B/A’s continue to supply air at the appropriate flow rate and pressure. Currently this is an important test to provide information to firefighters when they are considering issues of compatibility of their PPE/PPC. Additionally manikin style testing for all elements of PPE is valuable work, some of which is seen above.

There is much discussion in Europe about the issue of interoperability of SCBA fittings and components. This is a vital issue and not just in Europe, especially where two or more agencies work in conjunction on the same emergency incident site. Having compatible equipment is a must and even more critical in provincial areas of joint agency response where first response capability is limited and backup is some distance away. Additionally it is critical at major incidents where logistically the volume of resources is always a challenge.

One associated item of interest is ensuring that any air hose line equipment from a remotely located air bank trolley, is tested to the same chemical testing as your Haz-Mat suits, because the air supply hose may be dragged through the spilled chemical.

One of the major challenges for standards makers comes with ensuring all the ancillary equipment used in conjunction with SCBA is compatible and remains fit for purpose in the same hostile environment. To that end the NFPA has been doing good work on electronic components associated with B/A, and improved high heat and flame resistance of many of the materials used on B/A sets.

Additionally they have tested for the robustness of the components of a set with a Tumble Test which was first required in NFPA 1982, 2007 Edition (Standard for personal alert safety systems (PASS). One of the critical issues for PASS and DSU systems is to ensure that their alert tone is not the same as the common tone of building smoke alarms which are used in your country. It quickly becomes difficult to manage the recovery of a “downed firefighter” if the intervention team cannot distinguish the difference between these tones or alerts.

Communication systems have become an integral part of the SCBA or firefighters PPE. So to for the telemetry used to monitor firefighters real time air usage, physical data and a range of other important data sets. The ability to devise testing equipment and regimes which are reproducible, credible and have clear pass/fail criteria, and harmonize those tests with others used for the other associated elements of PPC/PPE, is the continuing challenge for standard makers around the world.

Therefore it is important when purchasing PPE to not only seek that a given item passes your required standard, but also be able to gain as much detail from the test data as possible. While test houses need to test different types of PPE in different ways, the focus remains, that when these items of PPE are put together, they will perform to protect the firefighters from the same exposure.

For further information, email markgribble7@bigpond.com

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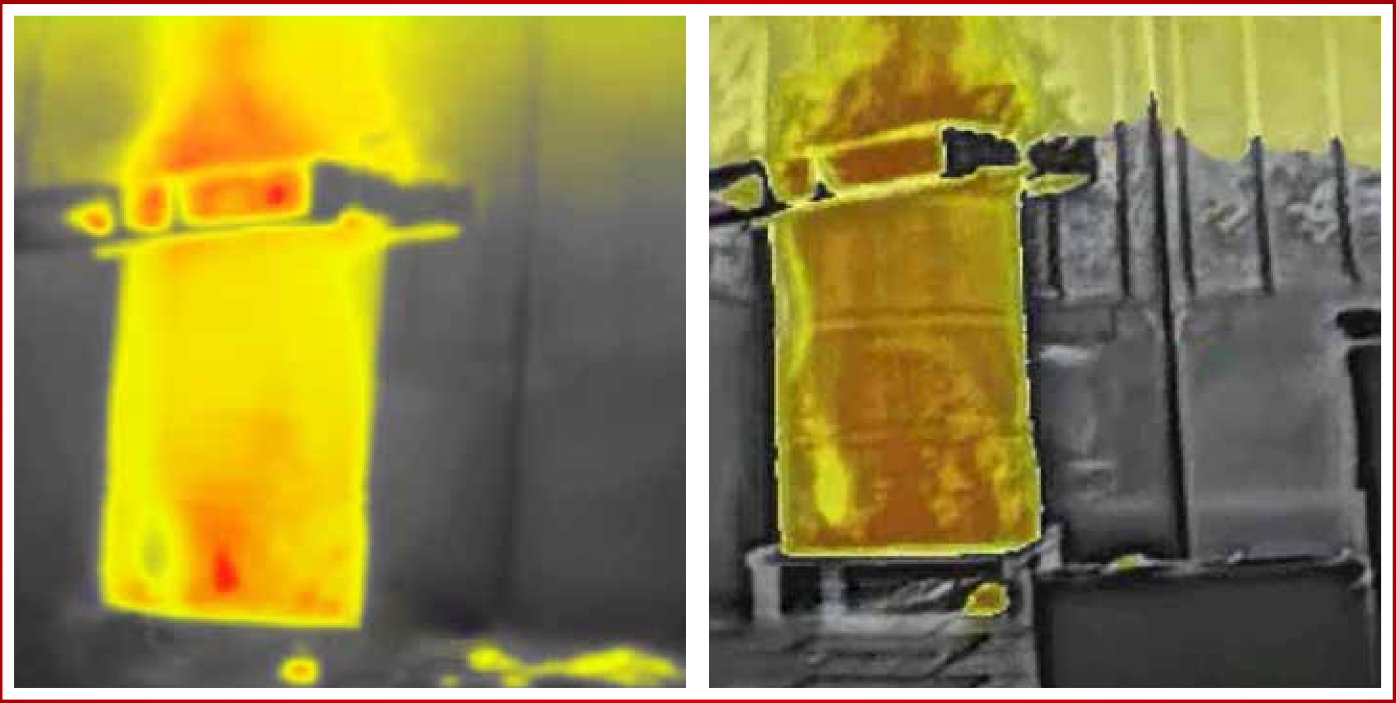

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Fire and Rescue NSW – Planning for the Future

The delivery of Fire, Rescue and Hazmat services in today's complex operating environment presents significant challenges for leaders within Emergency Services. Improving today's operational performance in addition to planning for the challenges and changes of the future requires a high level of integration across functional units within an agency, as well as close collaboration with other organisations.

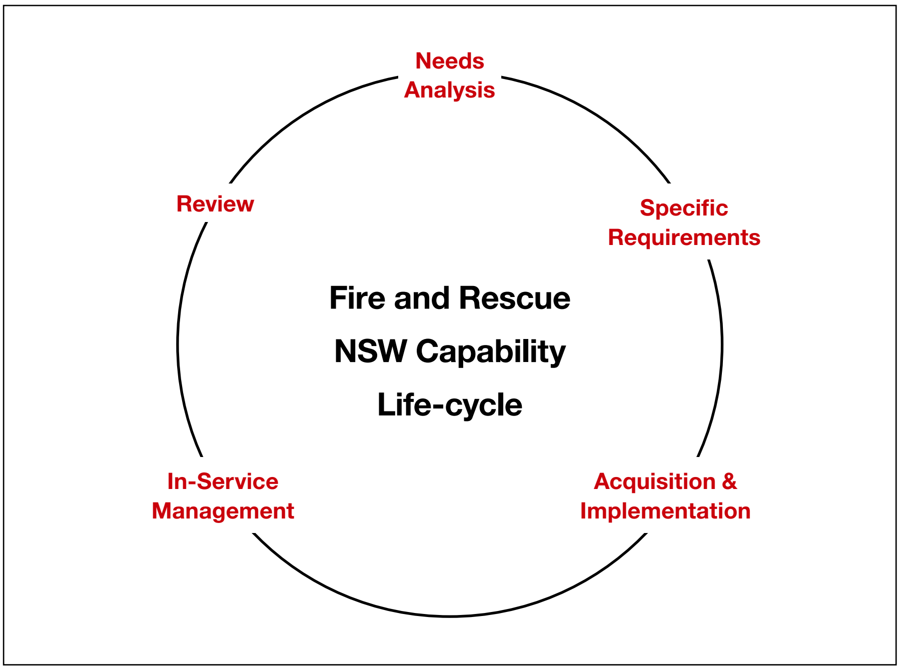
Paul McGuiggan

Chief Superintendent Paul McGuiggan is a 30-year veteran firefighter and currently Assistant Director of Capability Management for Fire and Rescue New South Wales (FRNSW). Chief Superintendent McGuiggan is a USAR IEC Team Leader and in 2011 deployed to Christchurch NZ as part of Australia's USAR response to that earthquake disaster area. Recently Paul assisted the Swiss Government during the 2013 INSARAG earthquake response Simulation Exercise (SimEX) fulfilling the role of the UNDAC USAR Manager.

One Australian Emergency Service organisation has challenged and changed the way that they have previously developed operational capabilities and as such are improving operational service delivery and sustainability.

Fire & Rescue NSW is the largest urban fire service in Australia and is responsible for preventing and responding to fire emergencies, providing direct protection to 90% of the State's population in major cities, metropolitan areas and towns across regional NSW. They are the largest accredited rescue provider in NSW, as well as being the combat agency for the State's urban search and rescue capability. Fire & Rescue is the also the combat agency for hazardous material incidents and has capability to deal with chemical, biological and radiological hazards, including those resulting from acts of terrorism. In addition to these responsibilities, the agency supports the State Emergency Service during major storms and floods, and the Rural Fire Service during major bush fires. In some locations, they also assist the NSW Ambulance Service with medical first response.

Image courtesy of USAR


Needs Analysis
Specific Requirements
Acquisition & Implementation
In-Service Management
Review
Fire and Rescue NSW Capability Life-cycle

Under Commissioner Greg Mullins leadership, Fire & Rescue has implemented an operational capability framework to improve its ability to better manage its service delivery. The development of Fire & Rescue's operational capability framework was undertaken by Noetic Solutions and is based on work undertaken by the Australian military. In order to define these services, Noetic worked with Fire & Rescue to develop a taxonomy of its current operational capabilities, comprising high level capabilities such as Firefighting, Hazmat, Rescue, Incident Management.

Fire & Rescue has a long and proud history of providing rescue services to the community of NSW. From its early involvement at major rescues such as the 1977 Granville train disaster, 1997 Thredbo landslide, the day-to-day industrial and motor vehicle accidents, through to its International Urban Search and Rescue deployments, their rescue operators have been at the forefront of rescue in NSW as well as on the National and International scene.

To ensure the organisation remained a leading rescue service Commissioner Mullins instigated a Rescue Summit which brought together firefighters from all over NSW to evaluate their existing rescue capability. The Summit assisted Fire & Rescue to build a shared understanding of its role in rescue service delivery – and explored the current and future possibilities. It also identified key issues for rescue capability and a set of priorities to develop a roadmap into the future.

Throughout 2014 the Operational Capability Directorate within Fire & Rescue led extensive consultation with all Operational Commands and key Directorates to develop an integrated whole of agency plan for rescue capability over the next five years. For Fire & Rescue, operational capability is the ability to deliver their services within specified time frames and then sustain that service delivery for the time required – whether it is rapid response to a structure fire or working alongside the Rural Fire Service or the State Emergency Service for many weeks during a campaign event.

Fire & Rescue Chief Superintendent Paul McGuiggan commented that, "an operational capability framework provides us with the means to more closely coordinate our operations and corporate support functions, the intention of the framework is to assist us to conceptualise, generate and manage capability in a more comprehensive way, and by under pinning the process with good project management, we hope to better sustain our operations and improve service delivery".

The capability framework proposed for FRNSW comprises four elements:

1. A description of the seven inputs to capability; **P**ersonnel, **O**rganisation, **i**nformation, **S**upport, **T**raining, **E**quipment and **D**octrine grouped under the acronym **POiSTED**.
2. A capability taxonomy which provides a listing of all of the operational capabilities generated by FRNSW including their subordinate, or contributing, capabilities.
3. A Capability Lifecycle beginning with the identification of capability **Needs** and progressing through the definition of **Requirements**, the Acquisition of new capability or **Implementation** of changes to existing capability, the **Management** of the capability in-service and its eventual **Withdrawal** and Disposal.
4. A governance structure which aims to embed the needs of the capability lifecycle in Fire & Rescue's decision making processes.

POiSTED + Readiness + Sustainability = Fire & Rescue NSW Capability

FRNSW HAS A LONG ESTABLISHED HISTORY OF RESCUE CAPABILITY THESE ARE SOME EXAMPLES

1977	1997	1999	1999	1999	1999	2002
Grandville train disaster	Thredbo landslide	Sydney hail storm	Glenbrook train disaster	Turkey Earthquake	Taiwan earthquake	Lake Cargelligo water tower accident
2003	2004	2011	2011	2011	2014	
Waterfall train disaster	Indonesian Tsunami	Queensland floods	Christchurch earthquake	Japanese earthquake and tsunami	Bilgla sinkhole	

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The POiSTED inputs to operational capability are tightly integrated. This means that, while each input may not have the same importance in delivering an operational service, they must be considered and addressed. Some examples of the POiSTED inputs to specific operational capabilities are:

Personnel

This input incorporates the recruitment, development and retention of people with the appropriate skills to deliver the services required. For firefighting, this includes the permanent and retained firefighters, as well as the trades and administrative officers required for the necessary support functions.

Organisation

This input incorporates the command and management arrangements to ensure that our operational processes are effective and that performance is monitored and evaluated. For our capability to respond to a terrorist incident, this includes maintaining partnerships with the NSW Police Force, Ambulance Service and the Australian Defence Force.

information

This input incorporates information and communications technology, as well as the software and data that are used as the basis of decision making. For incident management, this includes the computer aided dispatch system, geographic information system, mobile communications, as well as the outputs from operational debriefs.

Support and facilities

This input incorporates the infrastructure and services that support operations for Fire & Rescue, including those administrative and corporate services associated with capability. For Hazmat service delivery, this includes our Hazmat technical servicing facility, as well as breathing apparatus servicing and cylinder filling stations.

Training

This input incorporates the training required for each operational capability and the ongoing validation of training against operational performance to ensure that it continues to meet our needs. Training is closely related to Personnel, Organisation and Doctrine. For rescue in NSW, this includes the public safety competencies established by the State Rescue Board.

Equipment

This input incorporates major plant and equipment, including pumpers, aerial, rescue and Hazmat vehicles. It also includes the acquisition and safe use of equipment required for specific capabilities e.g. personal protective clothing for structural firefighting, decontamination equipment for Hazmat, and hydraulic equipment for rescue operations.

Doctrine

Doctrine is defined as “collective knowledge that has been structured and systematised to facilitate its application in practice and prepared for dissemination in a way appropriate for its intended audience” (AFAC, 2011, p. 2). It will enhance the effectiveness of operations through standardisation, provides a shared view of capability and is also the foundation of effective training. For Fire & Rescue, doctrine includes operational policy and procedures such as Standard Operational Guidelines and Recommended Practices.

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Image courtesy of USAR

The implementation of an operational capability framework, with the appointment of a dedicated capability management branch, represents a significant change in the way that Fire & Rescue NSW will develop and manage operations. There is still a large amount of work to be done, but with the finalisation of Fire & Rescue's Rescue roadmap the organisations executive is confident that they have the building blocks of our new operational capability framework in place.

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Australasian Fire and Emergency Service Authorities Council, 2011, Fundamentals of Doctrine: A best practice guide, East Melbourne, VIC, AFAC Limited.

Brown M, 2012, Implementing an Operational Capability System within Fire & Rescue NSW, Australasian Fire and Emergency Service Authorities Council Conference Paper, September 2012.

For more information, go to www.fire.nsw.gov.au

FIRE & RESCUE NSW CURRENT RESCUE CAPABILITY LEVELS

1 Rescue Operations	2 Rescue Operations	3 Rescue Technical	4 USAR Dom and International
Location 337 Appliances 547 People 7200+	Location 76 Appliances 106 People 1310+	Location 19 Appliances 34 People 380+	Location 3 Appliances 5 People 160+
■ All FRNSW firefighters are Level 1 rescue operators. ■ They receive recognised rescue training enabling competence in core rescue services as rescue operators. ■ They receive Basic Life Support training and provide initial rescue services across all FRNSW Fire Districts including road crash rescue. ■ Attain selected rescue units of competency in accordance with the Australian qualifications Framework.	■ FRNSW firefighters who are attached to primary rescue units are endorsed by the NSW State Rescue Board (SRB) as General Land Rescue (GLR) operators. ■ Have received recognised rescue units of competency in accordance with the SRB policy and are known within FRNSW as GRL rescue operators. ■ Have legislative responsibility for rescue operations within geographical areas as specified by the SRB. ■ Provide rescue support to level 1 rescue operators in both preparedness and emergency response	■ FRNSW firefighters attached to GLR units that can also provide other specialist rescue services such as USAR, vertical rescue, confined space and/or swift water rescue etc ■ Have proven rescue experience and provide rescue support to level 2 GLR operators and level 1rescue operators in both rescue preparedness and emergency response. ■ Have increased rescue equipment, training and overall rescue capacity.	■ Level 4 USAR technicians can respond internationally and are endorsed by the United Nations. ■ Have extensive rescue experience and provide rescue support to Level 3 rescue technicians and level 2 GLR operators in both rescue preparedness and emergency response. ■ Have capability that includes substantial rescue equipment usage, training and overall rescue capability. ■ Provide support to other accredited NSW emergency services accredited by the SRB.

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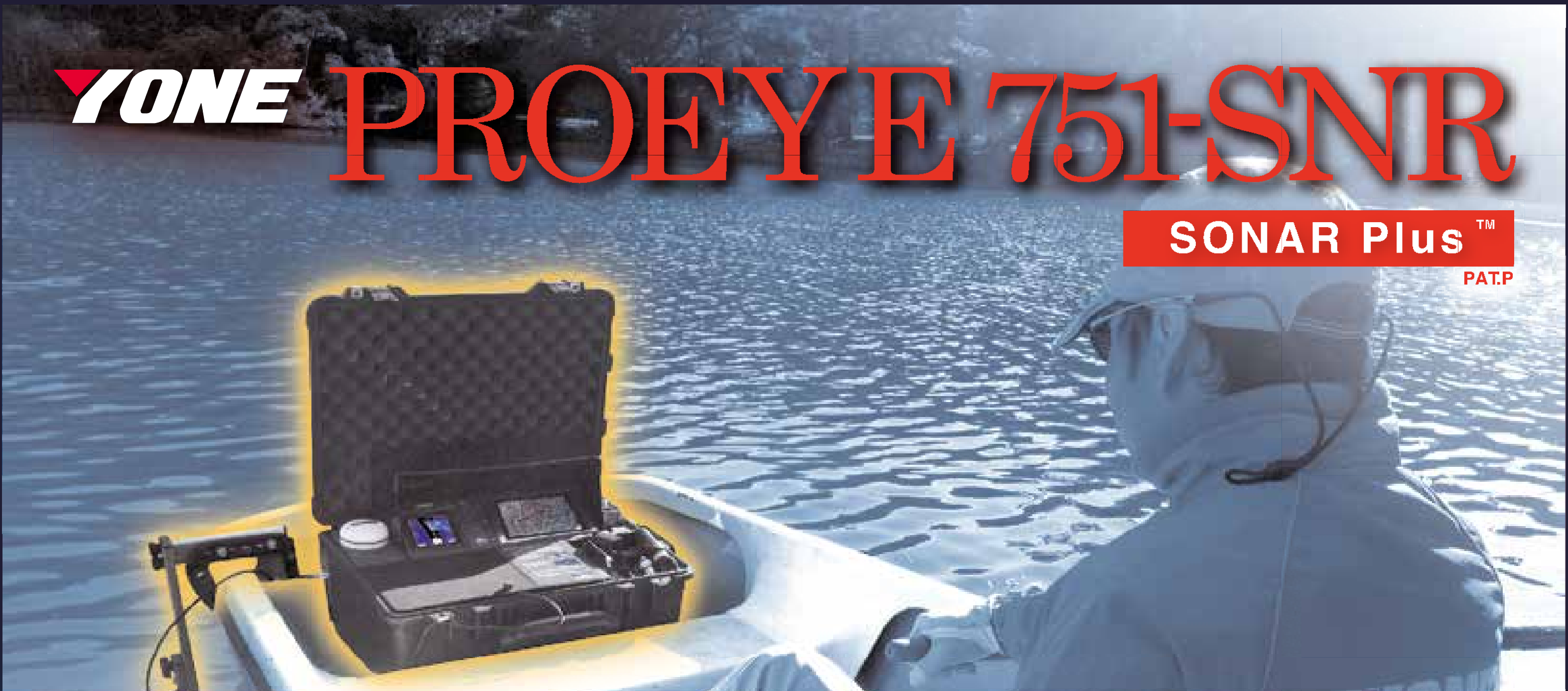

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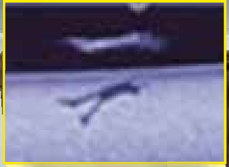
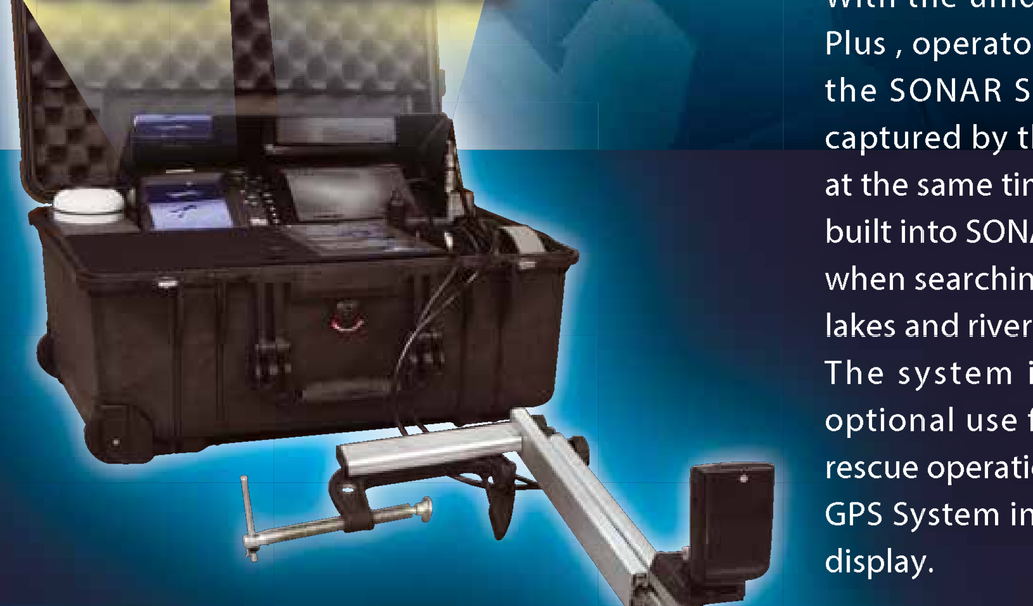


Sonar Image Display

U/W Camera Image Display



With the unique PROEYE 751-SNR SONAR Plus , operators can see sonar images from the SONAR System and real-life images captured by the Underwater Camera Head at the same time. The forefront technologies built into SONAR provides clear images even when searching the dark or cloudy waters of lakes and rivers.

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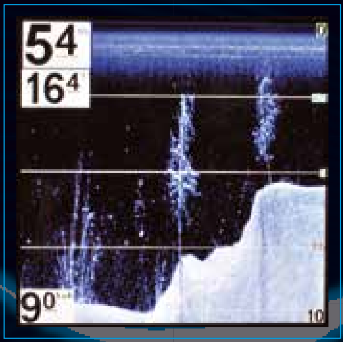
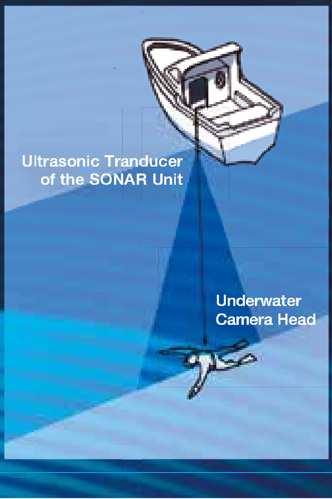
SONER Display image





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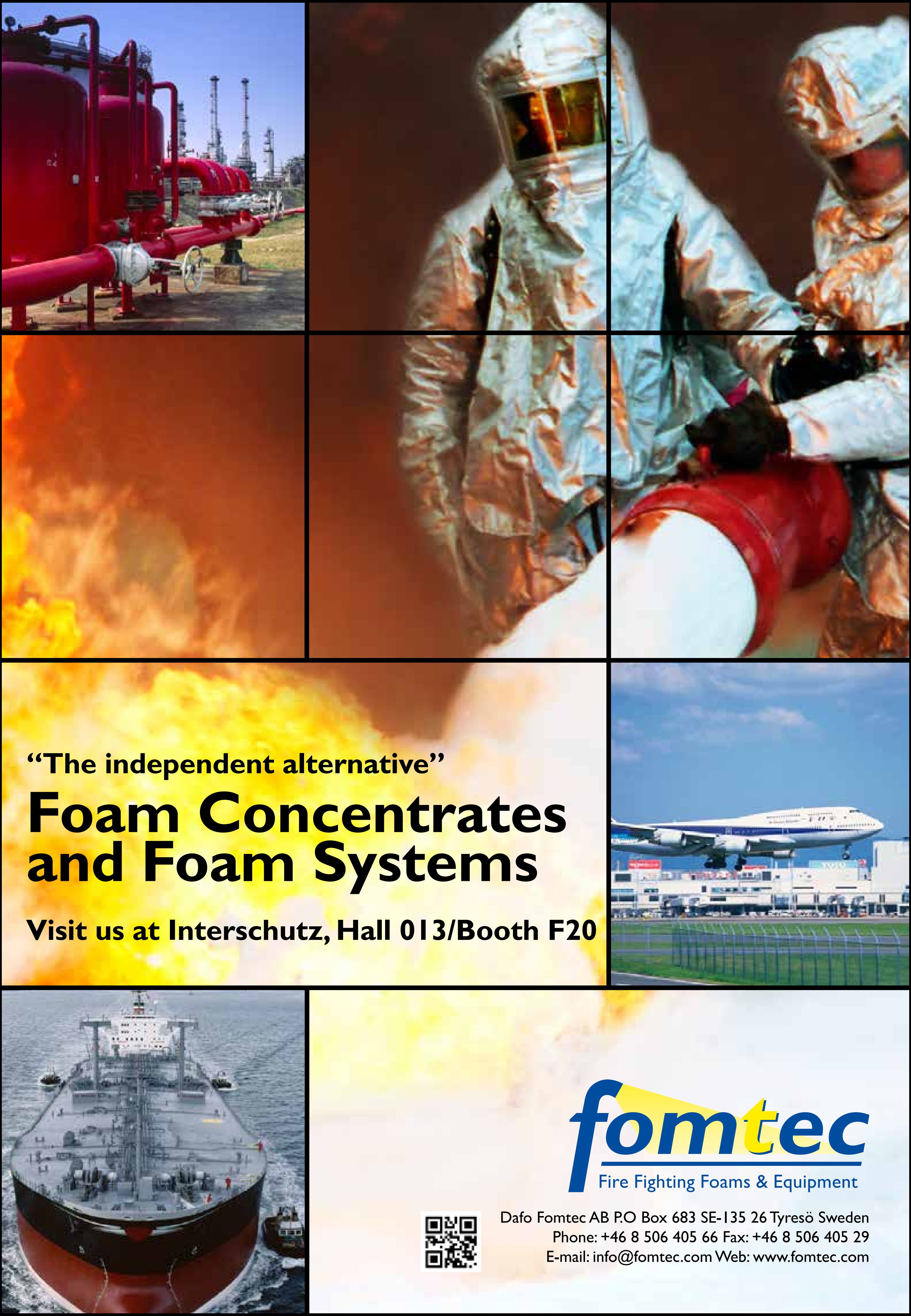

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Nozzles, Hoses and Monitors

Hardly surprising considering the impact they can have on fast, effective and safe firefighting, nozzles, hoses and monitors are constantly under the spotlight. Manufactures are continuing to invest in research and development to provide firefighters with new and improved products. So, what is new on the market?

Protek's New Offering

In the past year, **PROTEC** has introduced no fewer than five nozzles, a monitor and a multi-purpose hose wye (Y). The new nozzles are: the Protek Style 366-F low pressure selectable litreage nozzle; the Protek Style 326 new generation multi-mode nozzle; the Protek Style 355 low pressure selectable litreage nozzle; the Protek Style 356 low pressure selectable litreage nozzle; and the Protek Style 357 low pressure selectable litreage nozzle. The new monitor is the Protek Style 620 dual-purpose ground monitor, and the multi-purpose hose wye is the Protek Style 542.

The Protek Style 366-F low pressure selectable litreage nozzle has five flow rates up to 570 litres-a-minute at 5 bar – the flow rate settings being 110, 230, 360, 470 and 570 litres-a-minute. It is claimed to effectively minimise pressure on pumps and firefighter fatigue while delivering more water, with a 120 degree turn of the moulded bumper to switch from jet stream to fog pattern. Improved positivity of the flow selection ring ensures optimal stream performance. The Protek Style 326 new generation multi-mode nozzle boasts a combination pattern nozzle with combined selectable, automatic and low pressure modes, slide-valve design that reduces turbulence and controls flow rate while preserving quality stream, and again, an efficient 120 degree turn of the moulded bumper to change from jet stream to fog pattern.

The Protek Style 355 low pressure selectable litreage nozzle also features five flow rates up to 570 litres-a-minute at 5 bar – this time with the settings being 115,230, 360, 475 and 570 litres-a-minute. It incorporates a shock absorber in the bumper for greater resilience and a durable handle design for quick open/close operation. The Protek Style 356 low pressure selectable litreage nozzle with flow rate setting that are identical to the Protek Style 355, while the new and the Protek Style 357 low pressure selectable litreage nozzle has flow rate settings of flow rate settings of 230, 360,475, 570 and 750 litres-a-minute at 5 bar.

The new Protek Style 620 dual-purpose ground monitor has applications both as a portable monitor or a deck gun with a flow rate up to 3030 litres-a-minute. It features a 75mm waterway with cast vane, full 180 degree rotation and vertical travel of 65 degrees – from 75 degrees to 10 degrees above with inbuilt safety stops – and dual integrated ball shut-off that enables sealing and gating in either monitor inlet for enhanced control and flexibility. The Protek Style 542 multi-purpose hose wye enables two hose lines to be combined into one, or divides a single flow into two-way discharge.

For more information, go to www.protekfire.com.tw

Piercing Nozzle From TFT

The **TASK FORCE TIPS** Transformer Piercing Nozzle System is being cited for firefighting applications that demand tools that can be configured to perform multiple challenges. It is easily assembled to meet these various firefighting operations, from motor vehicle fires, to penetrating walls to apply water in hidden areas, or even piercing the skin of an aircraft to quickly suppress a fire while protecting the firefighting team.

Incorporating a rotational shutoff valve, a piercing head of hardened stainless steel, a striking head and various extensions, the Transformer Piercing Nozzle System is compactly stored in a nylon carrying bag. Weighing less than 6.2kg, an optional distributor head is also available to provide additional package performance.

For more information, go to www.tft.com

Fire Storm Nozzle From Darley

The new Fire Storm nozzle from **DARLEY** is claimed to deliver the quality and performance that firefighters are looking for in a selectable nozzle.

It offers the option of fog or straight stream patterns – with a quarter turn from straight stream to fog – with flows from 114 litres-a-minute to 564 litres-a-minute at 6.9 bar. Features of the Fire Storm include spinning turbine teeth, single piece, rubber handle and bumper and aluminium body construction. The nozzle has a 110 degree fog pattern, full-time swivel inlet, is capable of being flushed without shutting down, and a five-year warranty. The Fire Storm meets all aspects of NFPA 1964.

For more information, go to www.darley.com

Kidde's New Angus Hose

KIDDE AUSTRALIA has launched the Target extruded fire hose, a new development from Angus Fire in the UK that comes as standard in 38mm and 64mm by 30 metres.

The Target hose features circular woven all-synthetic high performance textile reinforcement, totally encapsulated in a specially formulated high grade synthetic rubber. Each length and all raw materials are manufactured under the controls of BS EN ISO 9001: 2008 Quality Management System and is certified to AS2792:1999. All stages of production and testing are controlled by Angus Fire.

Key features claimed for the new hose include: superior heat and wear characteristics due to its all-in-one construction; resistance to abrasion, chemicals, oil, weathering, ultraviolet and ozone; exceptional robustness and storage properties; and covered hose construction that means that Target can be wiped down after use and returned to storage without the need for drying.

For more information, go to www.kidde.com.au

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DRY WEIGHT: 39,5 Kg

MCH 16 ET COMPACT
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THREE-PHASE ELECTRIC MOTOR
CHARGING RATE:
265 L/min 16 m³/h
DIMENSIONS:
HEIGHT 88 cm
WIDTH 92 cm
DEPTH 61 cm
DRY WEIGHT: 187 Kg

MCH 16 ET STANDARD
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THREE-PHASE ELECTRIC MOTOR
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Time for TFT to Trigger an IMPULSE...

Never afraid to challenge traditional firefighting techniques, **TASK FORCE TIPS** is introducing the new IMPULSE trigger valve actuation system on eight high performance nozzle series during Interschutz 2015 in Hanover, Germany. The innovative integration of a trigger actuator with TFT's globally recognized slide style of shutoff valve provides complete nozzle operator flow control with only a single hand, allowing the other hand to consistently control stream pattern selections. The trigger controller operates smoothly and easily throughout the nozzle's rated flow and pressure range, and offers the ability to hold multiple valve positions at the operator's discretion. The unique color-coded ergonomic pistol grip compliments the trigger valve design and greatly reduces operator fatigue."

For more information, go to www.tft.com

Turbojet by Akron Brass

The Ultra-Wide Turbojet 25mm handline nozzles from **AKRON BRASS** boast a hard-hitting straight stream with the protection of nearly 180 degrees of ultra-wide fog pattern. The selectable litreage nozzle goes far beyond the traditional 120 degree fog pattern and is claimed to excel at fighting compartment fires such as in apartments, hotels, office buildings and aboard ships.

Akron Brass points out that fighting fires often requires the ability to attack with a straight stream, to cool gases with a 30 degree cone setting, and protect with the ultra-wide pattern setting. The nozzle offers all three settings with a turn of the pattern control bumper. The ultra-wide fog pattern measures about five metres in diameter creating a large wall of protection for the firefighter.

The Ultra-wide nozzle is lightweight, conforms to SOLAS and MED standards, and carries a ten year warranty. The bumper pattern control has a raised lug and tactile detent to help locate the narrow fog pattern, while the flush setting on the nozzle allows the firefighter to flush any debris that may block the stream or create disturbances in the stream without shutting down the water supply.

The Ultra-Wide Turbojet was designed with close communication to Britain's Royal Navy. The nozzle needed to have the capability of sealing a door or hatch, and this was achieved by creating the ultra-wide pattern setting. The nozzle was tested against fireballs at various pressures and protection was achieved using the ultra-wide setting. Many times the ships' pressures vary and the nozzle was required to be suitable for both low and high pressures.

For more information, go to www.akronbrass.com

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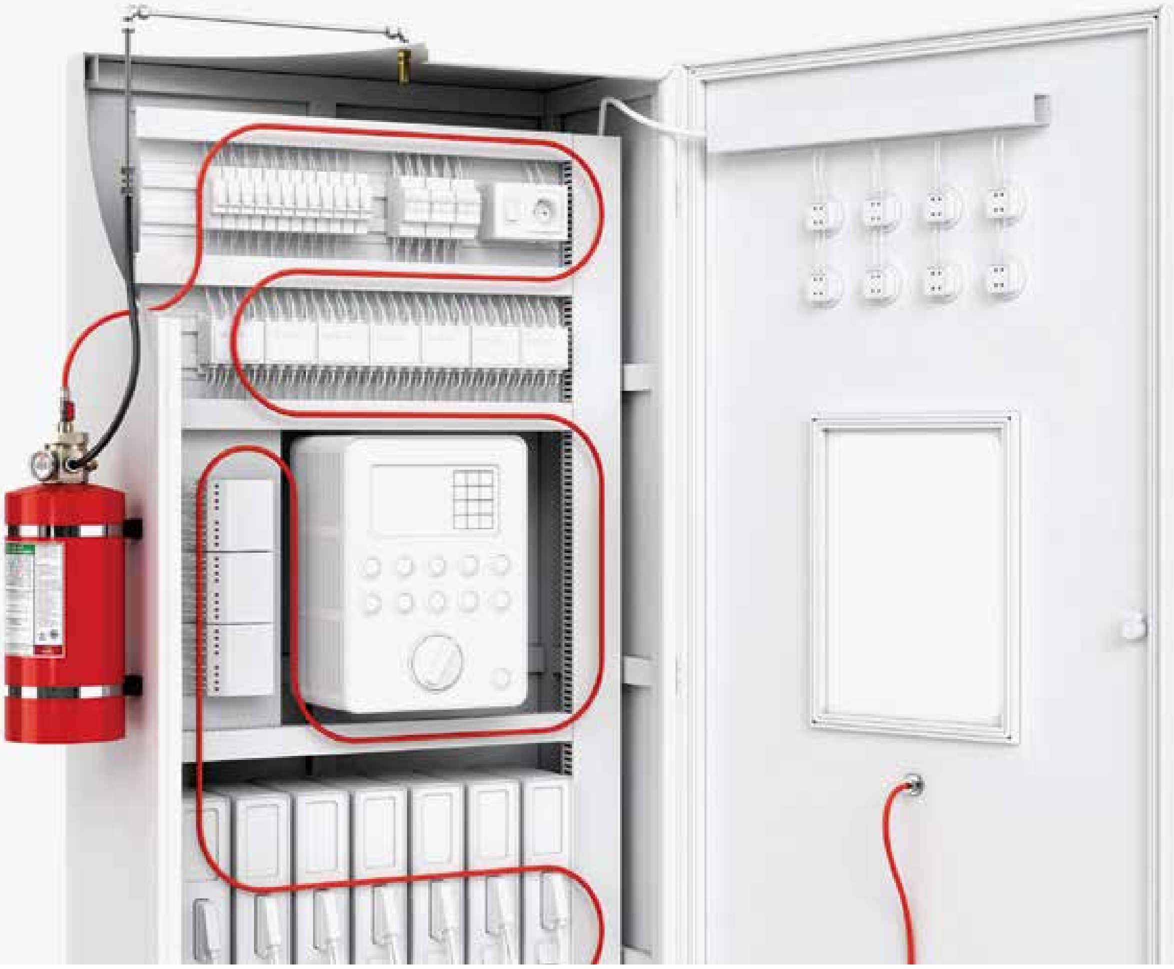

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Important Information on Smoke Alarms

If one piece of fire protection equipment is likely to save your life, it will be your residential smoke alarm. Accordingly, this simple device is a requirement of all new building stock under the Building Code of Australia, and this is complemented by gradual retrospective laws in most states and territories.

Joseph Keller

Joseph Keller is
FPA Australia
Communications Manager.

Today, having a working smoke alarm is a legal requirement in all Australian homes. Along with the ongoing educational work of fire agencies and organisations such as FPA Australia, such legislative requirements are aimed at a continued reduction in the number of residential fire deaths each year; however, residential fire safety is still an ongoing concern for the fire safety industry, authorities and the community. A significant number of fire deaths and injuries in Australia occur in residential buildings, far more than any other building type. Also, the speed at which fires develop is increasing due to the properties of materials and commodities now commonly found in residential buildings. This has the effect of reducing the time available to escape from a building.

The following are some important points for all readers of APF magazine to be aware of with regard to residential smoke alarms.

Ionisation versus Photoelectric

Currently, compliance with Australian Standard AS 3786 for smoke alarms as referenced by the BCA can be achieved in residential buildings by installing photoelectric or ionisation smoke alarms. Australian Standard AS 1670.1 for smoke detection as referenced by the BCA currently requires photoelectric smoke alarms to be installed in all sleeping areas and exits, as well as passageways, corridors, hallways, or the like that are part of a path of travel to an exit.

Within the fire protection community, there has been an ongoing debate as to which type of smoke detection technology offers the optimal performance in providing sufficient early warning to occupants in residential buildings. The debate is due to the two different types of fires that can occur in residential environments.

Building fires can be identified as either smouldering fires or flaming fires. While there are no significant data to suggest that one of these fire types happens more frequently than the other, the types of materials found in homes, combined with likely ignition sources, suggest the most likely fire encountered in a home while occupants are asleep will be a smouldering fire. Sleeping is the most vulnerable time as sensory cues are reduced. Each smoke alarm type performs differently as described below.

Photoelectric

Photoelectric smoke alarms contain a chamber with a light source projected into it. When visible smoke enters the chamber, it scatters and disturbs the light source, which is detected by a light sensitive receiver, causing the alarm to sound.

Published research has shown that although photoelectric smoke alarms are superior to ionisation smoke alarms in detecting the visible smoke produced by smouldering fires, they can be slower to respond to flaming fires.

Ionisation

Ionisation smoke alarms contain a chamber that is charged with electrical particles, called ions, by a small amount of radioactive material. This chamber is sensitive to small particles of combustion (typically not seen by the human eye) that enter the chamber and disrupt the balance of ions in the chamber, causing the alarm to sound.

Conversely, published research has shown that ionisation alarms are marginally superior to photoelectric smoke alarms in detecting flaming fires, which produce significantly less visible smoke than smouldering fires.

FPA Australia asserts that all residential buildings should be fitted with photoelectric smoke alarms in the first instance in order to treat the highest fire safety risk in residential buildings.

Interconnection

Many models of smoke and heat alarms offer the optional function of interconnection. When an interconnected smoke or heat alarm actuates, it places a small voltage on the interconnect circuit, which in turn powers the sounders in all other interconnected devices. The only device that is actually 'in alarm' is the one in the area of fire origin, even though all are raising the alarm.

Manufacturers specify the maximum number of devices that can be interconnected and exceeding this number may mean that the sounders will not function correctly and thereby not provide sufficient warning to the occupants. Manufacturers also specify the types and models of device that can be successfully interconnected. As individual manufacturers have no control over their competitors' product specifications, no manufacturer can claim a universal interconnection capability.

Manufacturers therefore preclude the interconnection of their devices with those of other manufacturers. The interconnection of non-related devices will void warranty, leaving the installer/certifier liable for the performance of the smoke alarm system. Simply interconnecting the devices and testing the interconnect function at time of installation does not provide an adequate assessment of long-term reliability.

Mains powered smoke/heat alarms typically do not use an isolation transformer when converting the 230Vac to 9Vdc. Instead, they use a capacitive/resistive circuit through a regulator and zener diode. This means the negative of the DC voltage is directly connected to the neutral of the incoming mains. The negative of the interconnect signal is therefore also directly connected to the neutral of the incoming mains. For this reason, when interconnecting mains powered smoke/heat alarms, the interconnect wiring must be treated as if it were at mains voltage and double insulation integrity must be maintained.

Heat alarms are not early warning and should never be used as the sole form of detection; sole reliance on heat alarms reduces safe evacuation time because a fire will have generally reached the flaming stage before triggering a heat sensor. Heat alarms provide supplementary detection in areas where smoke alarms may be overly prone to nuisance alarms. Heat alarms must be interconnected to the installed smoke alarms to provide a general warning.

This article contains extracts from FPA Australia Position Description 01 – Selection and Use of Residential Smoke Alarms. Readers can review this article and a range of other important technical documentation at www.fpaa.com.au/technical. To contact FPA Australia call 03 8892 3131.

For more information, go to www.fpaa.com.au/technical

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Frequently Asked Questions

When do Smoke Alarm Batteries Require Replacement?

Generally, smoke alarm batteries should be changed every 12 months. There are a number of models that are mains powered with rechargeable batteries, so there is no need to change the battery in these units. There are also 9 volt models with a 10 year non-removable battery, and these also do not require battery replacement.

Why is there a green light?

The green light is to tell you that the external power, 240Volt AC or 12Vdc (dependent on model), is on. This is a requirement of the Australian Standard for Smoke Alarms (AS 3786).

Why does the test button flash red?

The smoke alarm performs a self-check approximately every 40-60 seconds. The red flash is to tell you that the alarm is normal. This feature may not be included on all smoke alarms.

What does the ‘hush’ button do?

If your smoke alarm sounds because of cooking, for example, the hush button will silence the smoke alarm for approximately 10 minutes. This gives you time to clear the cooking fumes from the room. The alarm will automatically reset back to normal after 10 minutes.

How do I test a smoke alarm?

All smoke alarms have a test button, which may be a separate, clear button in the centre of the smoke alarm or a part of the smoke alarm cover. Gently push the test button and hold for approximately 10 seconds. The smoke alarm will sound. Release the test button and the smoke alarm will continue to sound for a few seconds and then stop.

Why do alarms chirp or alarm for no reason

There could be many reasons for a random chirp; however, the most likely reason is something causing electrical noise or spikes. This could be caused by the switching on or off of lights, particularly fluorescent lights, or some other appliance, such as air conditioning, heaters, or fans. Electrical noises like this can also cause flickering patterns on your TV or crackling/humming in your stereo or radio.

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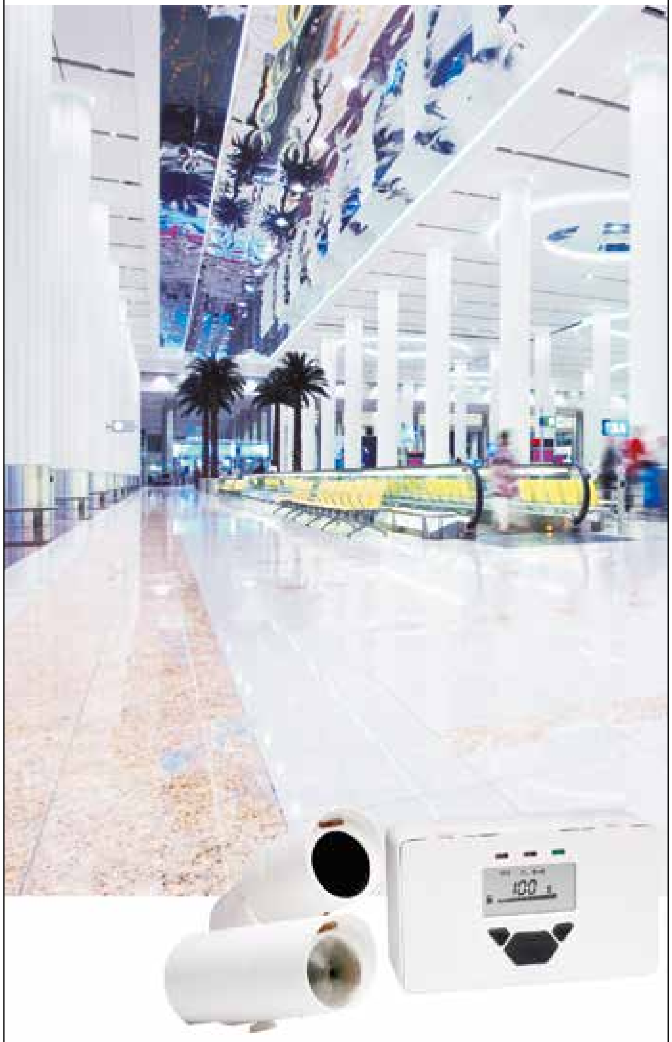

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The Role of Standards in Fire Risk Management

Standards Australia is the independent and not-for-profit developer of internationally-aligned Australian Standards. In this column, Dr Bronwyn Evans, the Chief Executive Officer of Standards Australia, talks about the role that standards can play in fire risk management.

Dr Bronwyn Evans

Dr Bronwyn Evans is Chief Executive Officer, Standards Australia.

Every summer, Australians are reminded to be fire-ready by being careful with their open fires, vehicles, machinery and to check their smoke alarms. On days when the weather is very hot, dry and windy, the fire authorities sometimes impose a total fire ban and limits on use of combustion machinery. These are days when the fire danger rating reaches very high levels.

It is with good reason that every Australian understands the gravity of the fire danger season. The Black Friday fires on 13 January 1939 in the state of Victoria razed almost 20,000 square kilometres of land, affecting nearly three-quarters of Victoria. Seventy years later, the Black Saturday bushfires on 7 February 2009 in the same state resulted in Australia's highest ever loss of life from a bushfire with 173 dead and 414 injured, over 3,500 buildings and sheds destroyed and 7,562 people displaced.

STANDARDS Australia

HB 46—2009

Fire Safety in the Home

A guide to fire prevention and protection

handbook

HB

The role of standards in fire risk management

Due to the sheer scale of the damage that fires can bring, public health authorities face a huge task to develop regulation that actively manages fire risks and protects the population. Often, public health authorities turn to standards in their regulation to provide a baseline level of safety requirements for houses, buildings, machinery and everyday objects.

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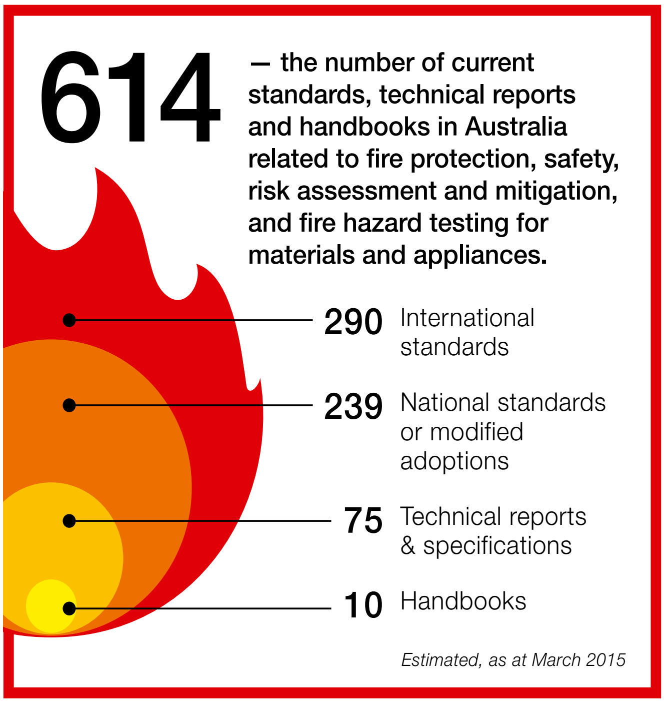
614 – the number of current standards, technical reports and handbooks in Australia related to fire protection, safety, risk assessment and mitigation, and fire hazard testing for materials and appliances.

Estimated, as at March 2015

has over 600 current standards, technical reports and handbooks related to fire protection, safety, risk assessment and mitigation, and fire hazard testing for materials and appliances.

The standards we have developed span a wide range of issues and topics. For example, an Australian Standard that specifically aims to help manage fire risk is AS 4655-2005 *Fire Safety Audits*. The Standard sets out minimum requirements for the auditing of fire safety measures in a facility against specific criteria to help users to gauge the suitability of their fire safety measures.

The personal safety of our nearest and dearest is emphasised in the Joint Australian/New Zealand Standard AS/NZS 1249:2014 *Children's nightwear and limited daywear having reduced fire hazard*. Containing flammability tests and garment labelling requirements for clothing manufacturers, the Standard aims to inform consumers about the fire hazard of different types of children's clothing.

We also develop standards for those at the front line. The Joint Australian/New Zealand Standard AS/NZS 4821:2014 *Protective footwear for firefighters – Requirements and test methods* provides minimum performance requirements so that firefighters' footwear does not melt or ignite when exposed to flame. This is an adoption of the European standard EN 15090:2012 with some modifications for the Australian context.

We update our standards continually to take into account the latest technologies, such as in smoke detection systems. Well-maintained smoke alarms can greatly reduce fire risks and are an integral part of fire protection systems. The 2015 edition of the Australian Standard AS 3786:2015 *Smoke alarms using scattered light, transmitted light or ionization* specifies requirements, test methods and criteria for all smoke alarms covered by this Standard. It also includes requirements for optional functions, such as sound output patterns (an option for the hearing-impaired) and extended temperature-range tests for smoke alarms installed in areas with a greater temperate range. This edition brings the Australian Standard in line with international standards and gives due consideration to Australia's specific environmental needs.

Regional and international harmonisation of standards

Fire safety is a critical issue that affects us all. It requires coordination and consultation across all states in a country to establish a harmonised set of rules and regulation.

Following Black Saturday, the state governments of Australia worked together to implement a new Australian fire danger rating and national bushfire warning system in October 2009. The system now includes a "Catastrophic" level ("Code Red" in Victoria) to help identify those situations where fires will spread so quickly that they present a critical threat to life and safety. The new system also acts as a trigger for the level of advice provided to the community when a fire starts.

This was an important step towards a national fire safety and warning system, and it is my belief that continued work on harmonised standards will help to strengthen and support the relevant regulation in this area.

On the global level, it is equally important for countries to work together to share best practices and technology. International standards development bodies such as the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) have brought together people from all over the world to develop important standards for fire safety and protection. Closer to home, the Pacific Area Standards Congress (PASC) convene yearly to discuss standardisation issues specific to the Asia-Pacific region.

In line with Standards Australia's goal is to develop internationally-aligned standards as far as possible, we are proud to represent Australia at international meetings at ISO, IEC and PASC.

Standards Australia's work would not have been possible without the numerous technical experts that make up our technical committees. We have 15 technical committees and 35 working groups on fire-related subjects comprising nearly 340 professionals and experts from the fire safety sector. We are fortunate to have worked with stakeholders such as the Fire Protection Association Australia, the National Fire Industry Association, Australasian Fire and Emergency Service Authorities Council, the New South Wales Rural Fire Service Association, and the United Firefighters Union of Australia, to name a few.

Our technical committee members have tirelessly contributed their time and invaluable insights to making Australia a safer place by developing standards on fire safety. They deserve our thanks as much as those working at the front line.

About Standards Australia

Founded in 1922, Standards Australia is an independent, not-for-profit organisation, recognised by the Commonwealth Government as the peak non-government Standards development body in Australia. It is charged by the Commonwealth Government to meet Australia's need for contemporary, internationally-aligned Standards and related services. The work of Standards Australia enhances the nation's economic efficiency and contributes to community demand for a safe and sustainable environment.

For more information, go to www.standards.org.au

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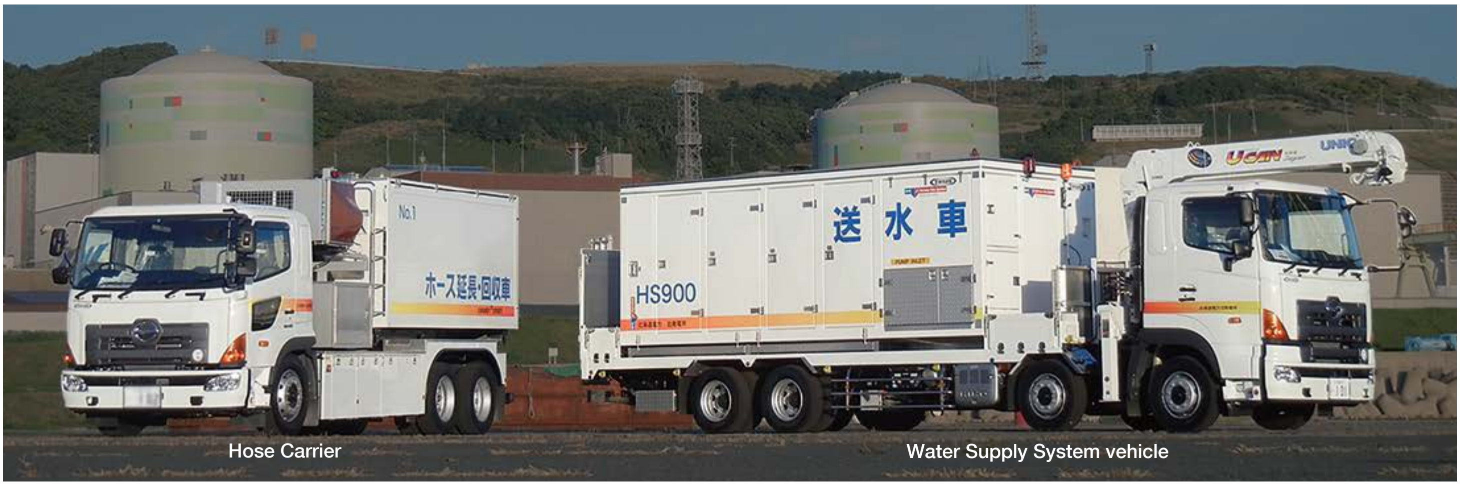

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■Water Supply System vehicle

Hydrosub Model		＊HS150	HS550(F)	HS900(F)	HS1200(F)
Water volume	L/min.	3,000	14,000	20,000	30,000
Water release pressure	MPa	1.2	1.2	1.2	1.2
Water intake depth	M	60	15	15	15
Vehicle dimensions	M(L×W×H)	8.0×2.5×3.5	12.0×2.5×3.5	12.0×2.5×3.5	12.0×2.5×3.5
Vehicle weight	Kg	15,000	22,000	24,000	25,000

● (F) includes foam mixer (option)　＊HS150 is a container model.

■Hose Carrier (with detachable hose container)

Hose Recovery Unit Model		HRU200 (for 150 ～ 200MM hose diameters)	HRU300 (for 250 ～ 300MM hose diameters)
Hose load	M	1,000 ～ 1,800M	400 ～ 600M
Vehicle dimensions	M(L×W×H)	7.8×2.5×3.8	8.4×2.5×3.3
Vehicle weight (hose not included)	Kg	12,100	14,300

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Building in Bushfire Prone Areas – Considerations for Construction

Australians have a fundamental connection to the bush. Much of our cultural folklore surrounds Australia's beautiful bushland areas. It is of little surprise then that many of us share a desire to build our dream home in such an area. In addition, the increasing urban sprawl of most major Australian cities is leading to increased residential construction in areas that have a high chance of bushfire.

Joseph Keller

Chris Wyborn

Joseph Keller is FPA Australia Communications Manager and Chris Wyborn FPA Australia Engagement and Education Manager.

The frequency and severity of bushfires in Australia as result of climate change is increasing, this was clearly evident by the tragic events of Black Saturday on 7 February 2009 in Victoria as well as many significant bushfire events since including the Blue Mountains fires in 2013. These events have led to a number of revisions in building codes and standards in relation to bushfire construction in Australia, in order to reduce the potential impact of these events in the future.

All of this leads to significant need for rigorous and safe bushfire construction measures to be implemented in a consistent and nationally harmonised way, and then be applied in a uniform manner by designers, certifiers and builders. This article will detail some important considerations when designing and constructing residential houses in bushfire prone areas for builders and property owners.

Understanding the legislative framework for bushfire construction in Australia

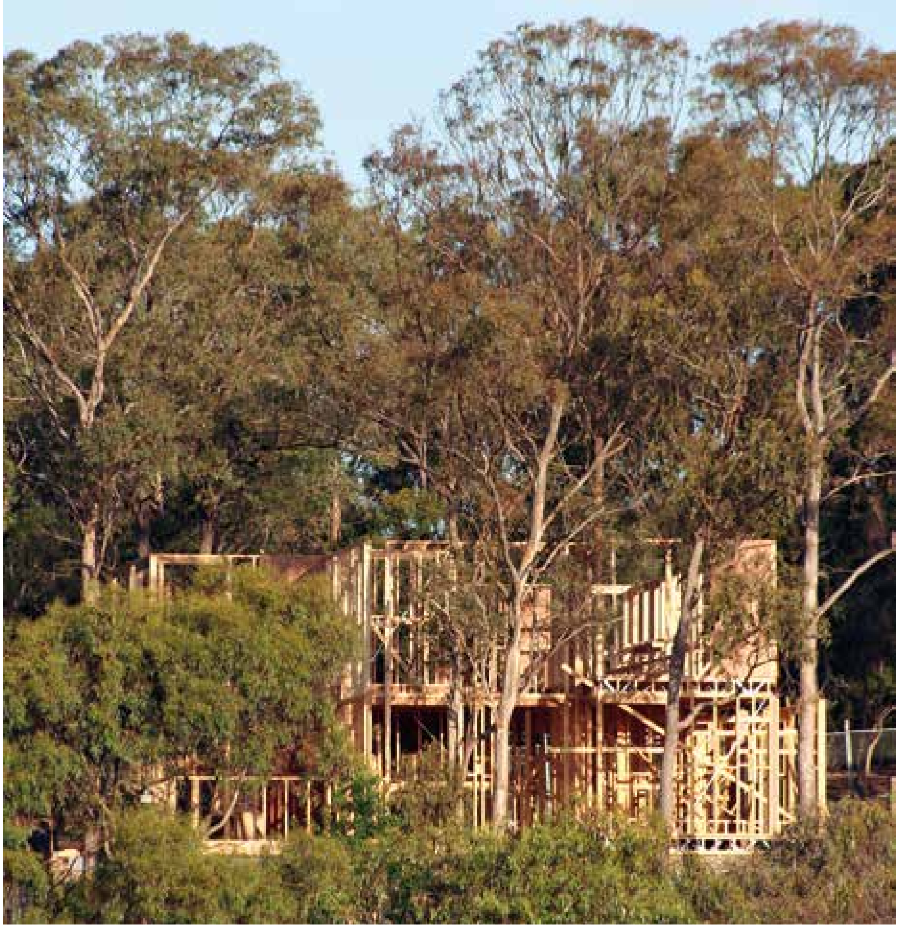
The construction of buildings in bushfire prone areas throughout Australia is generally governed by both the land use planning and building regulatory frameworks. In New South Wales , as an example, development for residential purposes on bushfire prone land must comply with the Environmental Planning and Assessment Act including Planning for Bushfire Protection published by the NSW Rural Fire Service or where applicable State Environmental Planning Policy (Exempt and Complying Development Codes) 2008. Each

Image courtesy of FPA Australia

state and territory will have its own requirements in this regard.

As readers of this publication would no doubt understand, construction in Australia is prescribed by the National Construction Code. Notwithstanding any land use planning requirements, standalone residential housing construction in bushfire prone areas is specifically controlled by part 3.7.4 within volume 2 of the Building Code of Australia “class 1 and class 10 buildings.” This part generally calls up some or all aspects of Australian Standard AS 3959-2009 Construction of Buildings in Bushfire Prone Areas as the primary reference document for construction requirements.

In New South Wales AS 3959-2009 is called up as the Deemed to Satisfy solution with the exception of Section 9 for Flame Zone construction. Buildings that are assessed as requiring Flame Zone construction are required to comply with Planning for Bushfire Protection including any specific measures required by the Rural Fire Service through a Bushfire Safety Authority which forms part of the Development Approval for the land.



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While the standard is generally applied across all states and territories in Australia, the way it is implemented may vary based on the requirements of various pieces of relevant legislation. These state based regulations primarily vary the planning requirements / instruments required for applying the standard and may tweak elements of the Standard, however, as a general rule the overall the requirements of AS 3959 are fundamentally the same across Australian jurisdictions.

An important component of construction in bushfire prone areas is determining the Bushfire Attack Level (BAL). The BAL is determined via combining the values of a range of measurements including the Fire Danger Rating for a given area, the vegetation classification, distance of proposed building site from vegetation and effective slope of the land proposed for development. There are five Bushfire Attack Levels as follows: BAL-12.5, BAL-19, BAL-29, BAL 40 and BAL-FZ. The numbers associated with each BAL level denote anticipated levels of radiant heat by kilowatts, while BAL-FZ stands for Flame Zone, the highest bushfire attack rating.

Bushfire rated construction materials

AS 3959-2009 is primarily concerned with improving the ability of buildings to better withstand attack from bushfire thus giving a measure of protection to the building occupants (until the fire front passes) as well as to the building itself.

Of significance to AS 3959-2009 was the publication (in 2007) of the AS 1530.8 series of standards that set out methods of test for building materials, elements of construction and systems subjected to bushfire conditions.

The publication of these standards provides confidence to builders and consumers that the use of products that have been demonstrated to meet specific test requirements will result in a safer building. The Standards also provide manufacturers with a standardised process and allows for fair and consistent evaluation of products.

AS 3959 -2009 allows for the use of tested materials, but it also allows for the use of other materials and components that have been deemed, but not tested, to withstand the assessed level of bushfire impact. FPA Australia believes that all products used in bushfire prone construction should be based on the results of testing.

Benefits of using tested construction materials

The main benefit of using a tested system or component is that only the specific materials and construction techniques used in the tested system can be deployed. This ensures that the final product when installed in the building will perform in the same manner as that originally evaluated by the Registered Testing Authority.

In contrast to a fully tested and certified system, use of a generic system or a non-tested product such as that detailed in Appendix I of AS 3959-2009 for roof systems does not allow for any control over the type of materials used or the method of installation.

FPA Australia considers that this makes a generic system or non-tested product far less reliable than a tested or certified system. This concern stems from the fact that there is no guarantee that the types of materials ultimately used on site will match those that were used in the testing and evaluation undertaken by the Registered Testing Authority.

FPA Australia considers that a generic system that uses different materials, or applies different construction techniques

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to those used in the testing and evaluation of an approved system may not pass the required test and therefore the building may be more venerable to the effects of a bushfire.

The selection of plywood installed as part of a generic system is an example of where different materials could be used. Plywood is a manufactured wood panel made from thin sheets of wood veneer. In Australia, plywood is widely available in many varying forms from numerous product manufacturers and importers. Plywood can be manufactured from softwood, hardwood and tropical timbers and the thin sheets of wood veneer can be bonded together using a variety of different glue products. Such variations in plywood production make it most unlikely that all brands of plywood will perform the same when tested under fire conditions. This is just one example of where product selection could influence the performance of a generic system.

New Technologies and Products

FPA Australia acknowledges that the initial application of AS 3959–2009 throughout Australia was troublesome for property owners, particularly those assessed as being subjected to a BAL-FZ rating. This was in part due to the unexpected adoption of AS 3959–2009 shortly after the Black Saturday fires. The rapid publication of the standard which included referencing of the newly developed AS 1530.8 standards, unfortunately meant that there was little opportunity for products to be developed and tested to comply with the new test standard.

Despite the problems associated with the initial publication of the standard,

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industry has responded by investing considerable funds to design and test systems to meet the new requirements. In fact the rapid release of the standard not only encouraged innovation, but defined an expected level of performance and an even playing field. This has resulted in an increased, yet appropriate level of protection for the community.

Referencing the AS 1530.8 series of standards as a benchmark requirement has created a demand for tested product that industry has responded to and continues to innovate towards. Multiple products that have been tested to and found to comply with the test standards are now available in the marketplace.

Home owners have a right to expect that design and construction to a particular assessed BAL level means just that. Any opportunity for a reduction in performance, inadvertently or otherwise through the use of generic systems or untested products should be very carefully considered to ensure consumer and community safety is respected as the priority when determining construction in bushfire prone areas.

Using Accredited Practitioners

All of the points outlined above highlight the importance of property owners and developers using trained, professional practitioners when bushfire reports are required during the planning, approval and development process when building in bushfire prone areas.

In order to meet this need Fire Protection Association Australia has developed the Bushfire Planning & Design Accreditation Scheme (BPAD). The Scheme accredits consultants who offer bushfire assessment, planning, design and advice services. BPAD practitioners meet criteria based on specific accreditation and competency requirements, including a detailed knowledge of the relevant planning, development and building legislation for each State and Territory. Through the Accreditation Scheme, BPAD Accredited Practitioners are recognised by industry, regulators, fire agencies, end-users and the community as providers of professional bushfire assessment, planning, design and advice services. The Scheme provides an enhanced level of confidence for government and the community that practitioners are accredited by a suitably robust scheme that is administered by the peak national body for fire safety.

Accredited practitioners are able to provide advice pre-construction and post-construction with respect to product selection, testing and compliance with AS 3959 -2009 and any required development approval. In addition an accredited practitioner can provide advice in relation to additional bushfire safety measures that are not prescribed as the minimum requirements. These measures can include the application of bushfire sprayer systems, construction and use of private bushfire shelters, emergency planning and bushfire survival plans and appropriate landscaping to reduce bushfire impact.

For more information about finding bushfire-tested building products visit www.fpaa.com.au/providers. for information about the BPAD scheme visit ww.fpaa.com.au/bpad or call the FPA Australia National Office on 03 8892 3131.

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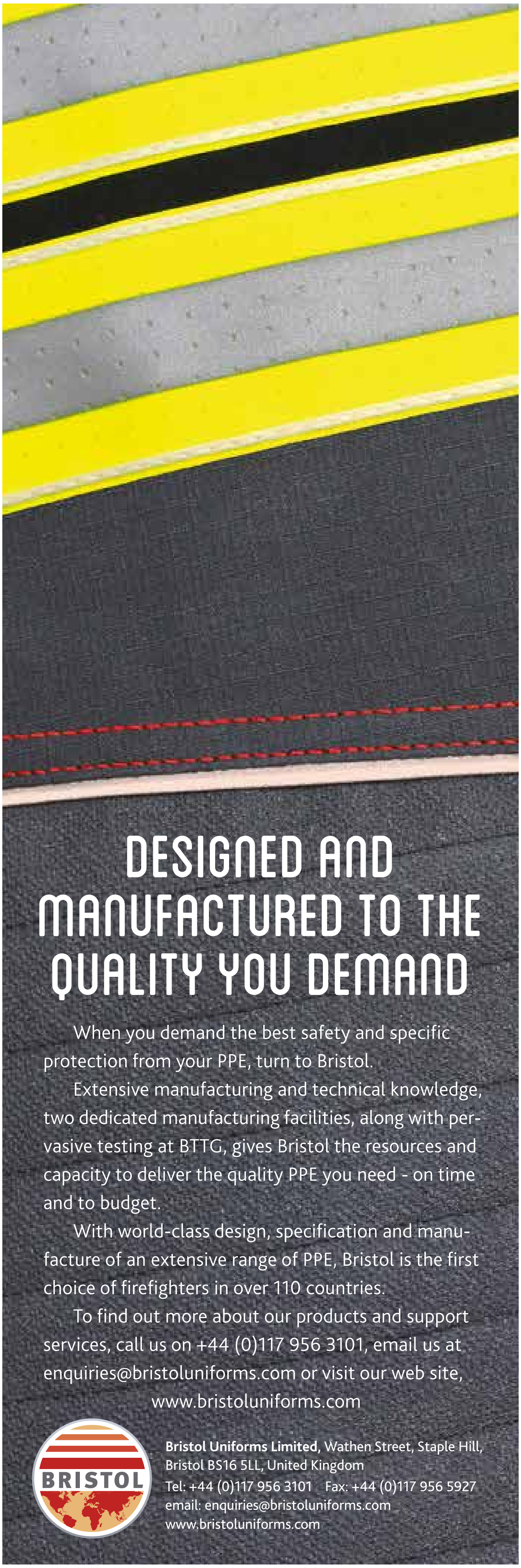

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The International Search and Rescue Advisory Group

The International Search and Rescue Advisory Group (INSARAG) is a network of disaster prone and disaster-responding countries and organizations dedicated to Urban Search and Rescue (USAR) from collapsed structures and operational field coordination.

INSARAG was established in 1991, following initiatives of international search and rescue teams who responded to the 1988 Armenia earthquake.

The United Nations was chosen as the INSARAG Secretariat to facilitate international participation and coordination. The Field Coordination Support Section (FCSS), located within the Emergency Services Branch (ESB) of the Office for the Coordination of Humanitarian Affairs (OCHA) in Geneva, functions as the INSARAG secretariat mandate.

- Render emergency preparedness and response activities more effective and thereby save more lives, reduce suffering and minimize adverse consequences.
- Improve efficiency in cooperation among international urban search and rescue (USAR) teams working in collapsed structures at the site of a disaster.
- Promote activities designed to improve search and rescue preparedness in disaster-prone countries, thereby prioritizing developing countries.
- Develop internationally-accepted procedures and systems for sustained cooperation between national USAR teams operating on the international scene.
- Develop USAR procedures, guidelines and "best practices" and strengthen cooperation between interested organizations during the emergency relief phase.

Image courtesy of USAR

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INSARAG Structure

INSARAG has a Steering Group and three Regional Groups (Africa-Europe-Middle East, Americas, Asia- Pacific) and a Secretariat (FCSS, OCHA Geneva). It holds annual worldwide FIELD COORDINATION SUPPORT SECTION (FCSS) international USAR team leaders meetings and has ad-hoc working groups to deal with specialized issues.

The role of the Steering Group is to determine INSARAG policy. It meets annually to define INSARAG strategy, review achievements and identify areas for improvement. It is composed of representatives from INSARAG's Regional Groups, the chairpersons of INSARAG ad-hoc working groups, the IFRC and representatives from the INSARAG Secretariat in OCHA-Geneva. The Regional Groups in Africa-Europe-Middle East, Americas, and Asia-Pacific meet annually to exchange experiences drawn from previous response operations. They discuss concepts for improved cooperation and coordination between international response teams in the region and present recommendations concerning worldwide issues to the INSARAG Steering Group.

INSARAG has established a Regional Antenna in Tunisia to facilitate the communication with North African and Middle East countries. The Regional Antenna is a permanent office, which is not a UN entity but an in-kind contribution by the host country to the INSARAG network. The sustainability of the Regional Antenna is ensured through contributions by the host country and other interested countries in the region. The activities of the Regional Antenna includes the translation of document and the INSARAG website into French and Arabic and to strengthen the network of stakeholders in the region through awareness training courses and briefing of INSARAG focal points.

INSARAG ad-hoc working groups develop solutions to identified problems. All INSARAG members are encouraged to participate in these working groups. Results of the working groups need to be reviewed by the INSARAG Regional Groups and endorsed in the Steering Group before implementation.

At INSARAG annual USAR team leaders meetings, international USAR team leaders discuss operational and technical issues regarding collapsed structure rescue. The Field Coordination Support Section (FCSS) within the Emergencies Services Branch (ESB) of OCHA Geneva functions as the INSARAG Secretariat.

How to become a member of INSARAG

Any country or organization with a stake in urban search and rescue is invited to join the network. Organizations wishing to apply for INSARAG membership can do so by addressing a request to the INSARAG Secretariat through their respective Governments. INSARAG member countries are requested to identify an INSARAG focal point that acts as interface with the INSARAG Regional Group and the INSARAG Secretariat.

The advantages of INSARAG membership

INSARAG members are part of a worldwide knowledge-sharing network on collapsed structure rescue and operational field coordination. They are invited to annual meetings of the relevant INSARAG Regional Group and to participate in INSARAG working groups. Furthermore, members have access to INSARAG's information and knowledge-sharing tool, the "Virtual OSOCC" (Virtual On-Site Operations Coordination Centre - http://ocha.unog.ch/virtualosocc) and the Global Disaster Alert and Coordination System (GDACS - http://www.gdacs.org/) on the internet, which provide alert notification in the event of a sudden-onset disaster and real-time information updates and coordination during ongoing disasters.

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What are the responsibilities of INSARAG members?

As specified in GA Resolution 57/150 of 16 Dec 2002 and the INSARAG Guidelines:

- Disaster-affected countries:
- Conducting damage and needs assessments as quickly as possible;
- Specifying and prioritizing the nature of assistance required in the request for international assistance;
- Facilitating immigration procedures for international relief personnel;
- Designating a government entity with unique responsibility for coordinating international relief activities;
- Providing information updates and requests immediately on the Virtual OSOCC,
- Use the Reception Centre and OSOCC to facilitate the integration of international assets in the national response effort. assisting countries:
- Deploying only USAR teams that comply with the INSARAG Guidelines;
- Including capacity in USAR teams to be able to cooperate with, establish or strengthen the Reception Centre or OSOCC in the field;
- Providing updates about their response on the Virtual OSOCC.

What is an OSOCC?

An OSOCC is an On-Site Operations Coordination Centre set up for the purpose of assisting local authorities in a disaster-affected country with the coordination of international relief. The OSOCC should be established as soon as possible following a disaster incident by the first arriving international USAR or United Nations Disaster Assessment and Coordination (UNDAC) team deployed by OCHA.

What has INSARAG developed and achieved?

In the years since its inception, INSARAG's achievements include:

- Adoption of UN GA Resolution 57/150 on "Strengthening the Effectiveness and Coordination of International USAR Assistance" on 16 December 2002;
- Establishment of a worldwide network of disaster relief organizations divided into three Regional Groups: Africa-Europe-Middle East, Americas and Asia-Pacific;
- Development of Guidelines for international USAR operations, including an international collapsed structure marking system (INSARAG Guidelines);
- Development of an operational field coordination system whereby Reception Centres are set up at entry points into affected countries to facilitate the arrival of USAR teams;
- Development of a concept for the On-Site Operations Coordination Centre (OSOCC) to assist the affected country with the coordination of international response used in all major earthquakes;
- Development of standard criteria for international USAR teams;
- Establishment of a database of international USAR Teams and INSARAG member countries on the internet;
- Creation of the "Virtual OSOCC" on the internet to ensure immediate alert and real-time information exchange following sudden-onset disasters;
- Successful operational coordination of international USAR assistance in the major disasters of recent years, in cooperation with OCHA-Geneva;
- Establishment of a Regional Antenna office in Tunisia to strengthen the INSARAG network in Africa and the Middle East,
- Modification of national disaster response plans in disaster-prone countries to include INSARAG coordination methodology such as use of the Virtual OSOCC, use of the UNDAC team and interaction between local disaster management authorities with Reception Centre and OSOCC.

INSARAG Collapsed Structure Marking System

INSARAG Guidelines stipulate that all USAR teams use a standardized marking system on collapsed structures at the site of an earthquake or man-made emergency. This is to ensure that international urban search and rescue teams can reliably communicate with each other, irrespective of language, in order to avoid duplication of efforts.

Find out more about INSARAG

INSARAG Secretariat
Field Coordination Support
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of Humanitarian Affairs (OCHA)
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Defence Science & Technology Organisation, CBRN Research

Defence Science and Technology Organisation (DSTO) is a national leader in safeguarding Australia by delivering valued scientific advice and innovative technology solutions for Defence and national security. DSTO's chemical, biological, radiological and nuclear (CBRN) research aims to effectively prevent, respond to and defend against CBRN attacks in military and civil environments.

To this end, one focus of the DSTO research program is to provide protection for individuals from unavoidable CBRN hazards. Current CBRN individual protective equipment (IPE) provides high levels of protection for long periods of time, having been designed to meet requirements originally perceived for military cold war threats. These garments impose a high thermal burden on the wearer, and can constrain user functionality and mobility. As such, user workloads are reduced and mission completion times are increased.

Reducing the burden associated with CBRN protective clothing would improve mission outcomes in a CBRN environment. As such the DSTO focus is to provide greater operational ability, to optimise the balance between protection and burden.

What do we mean by low burden? Burden can mean ergonomic/system integration/thermal/situational awareness. All are affected by CBRN IPE and there is traditionally a trade-off between protection and burden. For example, high protection is relatively easily achieved in Level A Self Contained Breathing Apparatus (SCBA) equipment, but users can only operate for a short period of time. Current military CBRN IPE allows users to work for longer than Level A equipment; however CBRN ensembles still provide significant impediments to operational capability when compared to standard uniforms. Particular issues include reduced heat transfer ability through wearing heavy, bulky over garments, over boots which are cumbersome, bulky gloves which reduce tactility for fine motor tasks, and respirators which reduce field of view and communication ability. Functional requirements for low burden IPE garments

Image courtesy of Defense Services photo gallery

Image courtesy of the Defense Services photo gallery

can be defined as: light weight, low thermal burden, ease of movement and low bulk materials.

Modelling of current scenarios shows that high challenge levels are still possible, however exposure to these high concentrations is likely to be for short periods of time, for both military and civil response users. Longer term protection, if required, will be against much lower concentrations. Additionally, CBRN IPE has historically focussed on liquid and vapour threats, and the inclusion of aerosol protection would improve protection for users.

These changes in scenarios have caused DSTO to reflect on user requirements for IPE and to articulate what low burden IPE means in the current and future environment. This has allowed DSTO to develop a clearer understanding of the requirements for modern IPE and to develop innovative programs for delivering low burden IPE through the application of novel materials. This two pronged attack allows DSTO to focus on the delivery of low burden IPE with both a requirements focus: what does the user need to be able to do their job effectively; as well as from a science perspective: what is achievable and possible from IPE fabric and materials systems. Combining this holistic approach with high value test and evaluation capabilities allows DSTO to deliver high quality research into low burden IPE solutions for the ADF, an approach easily transferred to civilian first responders.

To produce effective low burden IPE that provides a significant improvement on current ensembles in terms of thermal and operational performance, fundamental questions need to be answered:

1 What are the likely dermally relevant challenges that users might experience?

Using plume dispersion models, like the US-developed Hazard Prediction and Assessment Capability (HPAC), with inputs from meteorological data, urban models and terrain models DSTO can predict the results from specific outdoor CBRN releases. The data generated includes the extent and spread of the challenge, how it spreads in the environment, what proportion of the contaminated area has “high” or “low” concentrations and how long the hazard remains in the environment. The HPAC plume modeling provides a predicted average value for outdoor releases.

Dispersion modeling can also be used to predict challenge levels for indoor releases. The models used generate a timeline, which demonstrates that concentrations experienced at a single location are often highly variable. The maximum concentration achieved and the length of time that high concentrations persist are more important than simple average values when it comes to determining the protection required for people exposed to that environment. Using time resolved protection requirements allows DSTO to tailor the protection provided by the protective materials, optimizing protection.

2 Concept of operations: how long must users remain in IPE, endurance requirements, and work rate requirements

By combining the CBRN challenge predictive capability with war gaming (operations research) detailed effects on the user population can be determined. This is extremely useful for performing trade-off studies such as determining appropriate protection levels required, and what levels of heat stress might cause missions to fail. This allows DSTO to test scenarios which are difficult or impractical to assess with field trials, and feeds back valuable information about protection requirements and thermal burden trade-offs in scenarios that users could be expected to experience on the ground. It also allows DSTO to target physiological experiments to provide the best data available with minimal resources.

Once these questions have been answered, this defines what the users need or desire. Within the limitations of current technology DSTO (and more broadly Defence) then has a clear basis from which to develop requirements for low burden IPE that can provide a significant improvement in capability for users.

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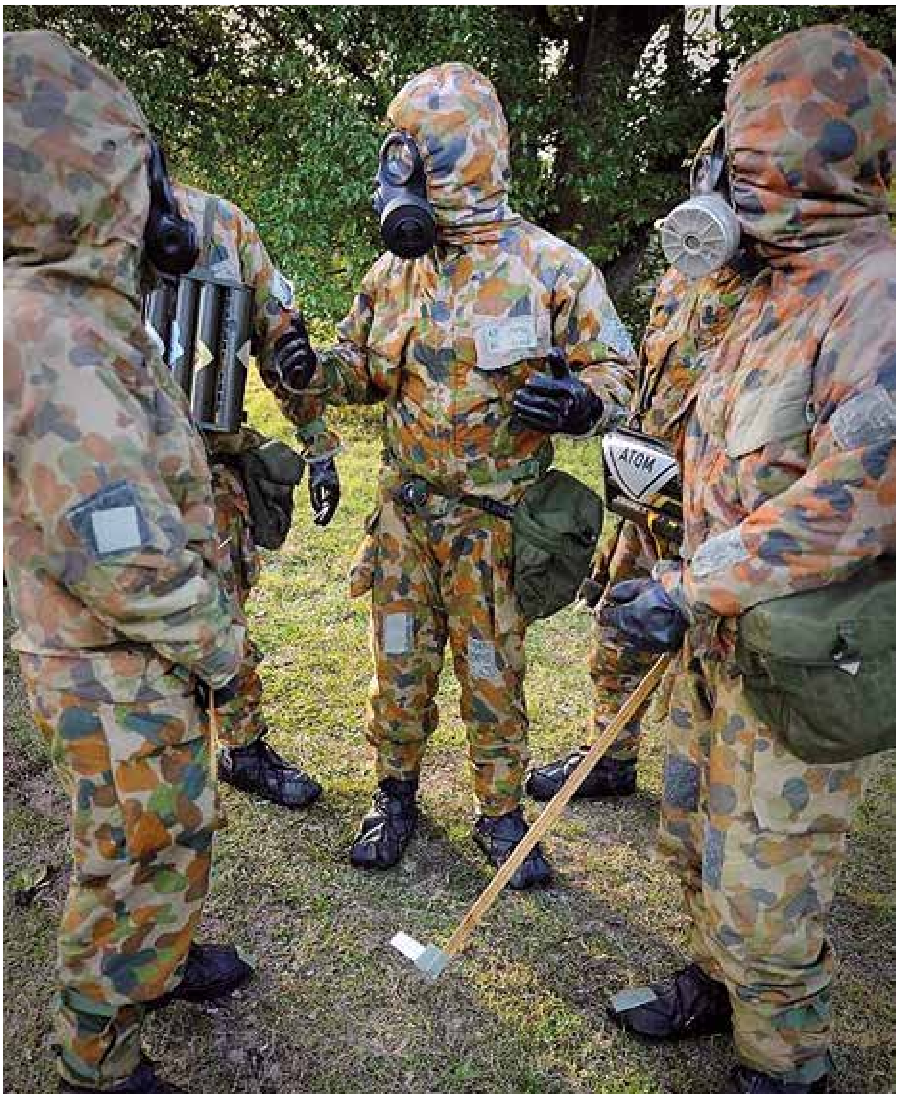

Image courtesy of the Defense Services photo gallery

A parallel approach is to take scientific concepts and determine how effective they are at providing protection; this allows scientists to take innovative approaches to solve the problem. For example for IPE material concepts: if we make a fabric with particular properties what would it look like? How well will it provide protection? How well will it perform in an operational environment? DSTO can evaluate the gain in performance versus the protection and how this compares to those options generated from the requirements studies.

Science driven concepts also allow us to determine where the knowledge gaps are. With specific designs, how would we make them work, what future investigations for different components are needed? What is possible, what is improbable/too far-fetched?

Two different developments at DSTO highlight laboratory work which showcase the requirements driven (systems testing) and science driven (novel materials development) aspects of our work.

Novel Adsorbent Fabric

DSTO is investigating an innovative nanofibre membrane concept as an alternative to activated carbon cloth/scrims in protective clothing. In current technology suits, combined aerosol and vapour protection can only be delivered through air impermeable membrane materials which cause significant thermal burden. DSTO is investigating a lightweight aerosol filtration membrane made from nanofibers. These nanofibers are generated with adsorbent media inherently embedded in the fibres, to provide protection against vapour challenges.

Proof of concept work has shown that this composite membrane can successfully remove vapour and aerosol challenges from the airstream, while providing some air permeability. DSTO is now advising the Defence Materiel Technology Centre on the progression of this technology from the research concept stage.

New evaluation systems

Being able to effectively measure the protection and performance provided by low burden IPE is critical to its success. To that end, DSTO has a suite of tests available to measure the performance of IPE. We can effectively measure the relative thermal performance of different IPE systems through fabric swatch testing, and thermal manikin testing to evaluate expected thermal burden and translate this information into the loss of capability or functionality for the user. Chemical protection capabilities of the materials can be tested in purpose built facilities against target chemicals of interest. However fabric swatches only provide part of the story, as extremely effective fabrics do not make extremely effective suits unless the design is right and closures and seams minimise leakage gaps. DSTO's manikin test facility is currently being validated and will provide system level detail on the protection capabilities of suit systems and integration of IPE.

Current international best practice systems testing of this type measures end point skin exposure values, which provides the cumulative results of leakage under the suit at different points on the body across the entire program of manikin movements. DSTO has developed real time breakthrough measurement capability that allows scientists to monitor vapour challenges breaking through the suit, and to correlate the break through events with particular movements or exercises. This capability will add to the available data to determine causes of suit failures from either fabric, suit design or system integration issues.

The combination of fabric swatch testing and manikin testing for chemical and thermal performance provides DSTO with the ability to assess different IPE suit systems in detail, and to determine if IPE systems meet requirements. These results, combined with modelling of use scenarios allows DSTO to deliver advice on the most effective equipment combinations to optimise the trade-off between protection and thermal burden effects of CBRN IPE.

For more information, go to www.dsto.defence.gov.au

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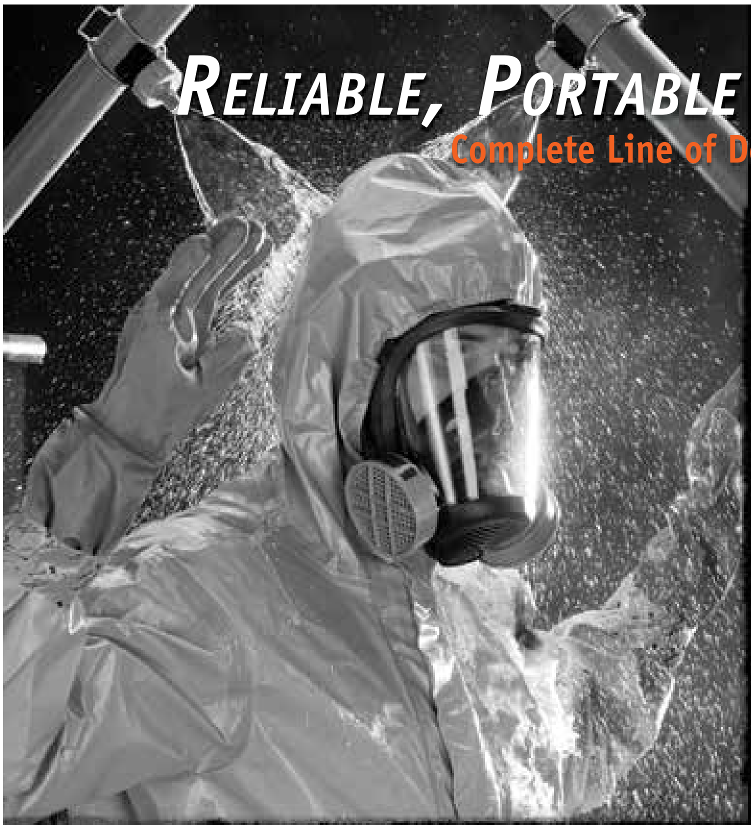

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Where to next with Fire Modelling?

Excessive amounts of heat and moisture generated by large bushfires can affect the surrounding atmosphere, changing wind speed and creating pyroconvective (thunderstorm) clouds. These in turn can profoundly change the way a bushfire behaves. Researchers are starting to incorporate these vital elements into operational fire behaviour models.

Nathan Maddock

“Our biggest fires influence the atmosphere and weather around them,” says Dr Simon Heemstra, Acting Group Manager Community Resilience at the New South Wales Rural Fire Service, and Lead End User Representative for the Bushfire and Natural Hazards Cooperative Research Centre (CRC).

“These are our worst fires, and yet they are the ones that are really hard to forecast what is going to happen, because we do not know how the fire and the weather interact.”

Fire modelling is a vital part of the firefighting toolkit, with significant advancements made in the past decade. The current knowledge for fire behaviour analysts has been recently published as a practical guide by AFAC and CSIRO, based on a Bushfire CRC-commissioned synthesis report. The guidebook presents the here and now; but coupled fire-atmosphere models, incorporating how bushfires influence the atmosphere, and therefore the weather, are a key pathway to the future.

This new technology and know-how is still years away from operational use, but the research is underway now through the Bushfire and Natural Hazards CRC, ensuring fire agencies across Australia will continue to use the latest knowledge to fight fires. Dr Jeff Kepert, Head of High Impact Weather at the Bureau of Meteorology (BoM), is leading the project with BoM colleague and recent Bushfire CRC PhD scholarship graduate Dr Mika Peace part of the team, along with Dr Heemstra.

“By having a coupled fire-atmosphere model, we are going to get a much more accurate forecast leading into the really bad days,” Dr Heemstra said.

The same applies after bad fire days too, if there have been big fires.

“The State Mine Fire in the Blue Mountains in October 2013 ran 35 km in one day and left a massive amount of black ground behind,” Dr Heemstra said.

That affects the weather models, as they are based on a certain amount of reflectance from the earth’s surface. Changing from green vegetation to burnt black makes a big difference.

“We found that the winds and the temperatures in the days following were not as forecast. A coupled fire-atmosphere model will give a better indication of this,” he said.

The project is using the Weather Research and Forecasting fire model, known as WRF-Fire, which was developed in the USA. Dr Peace completed her PhD through the Bushfire CRC in 2014 using WRF-Fire to investigate interactions between fire and the atmosphere leading to extreme, or unexpected, fire behaviour.

“We have learnt all sorts of things about dynamical fire-atmosphere interactions using the model – things we could not have found out about through taking observational measurements at the fireground,” Dr Peace said.

“That is the big advantage from coupled fire-atmosphere models from a research point of view.”

One of the big challenges of combining a fire model with an atmosphere model is computer power, and it has only been in recent years that the computing speeds required to merge the two have become realistic.

Naturally WRF-Fire is being configured for Australian conditions, with the first year and half of the project devoted

Nathan Maddock is Communications Officer for the Bushfire and Natural Hazards Cooperative Research Centre.

Image courtesy of Wayne Rigg, CFA

◀ **Coupled models will be able to better predict fire behaviour along ridgelines, such as this bushfire in the Grampians National Park in Victoria, 2014.**

to recreating the fire model within the BoM's operational atmospheric model. The BoM upgraded to a new modelling system in 2009, which has brought a large improvement in weather forecast performance.

Dr Peace believes it is important to define the outcomes into something fire behaviour practitioners can use. As fire danger ratings are number based, the researchers hope to integrate particular fire phenomena into a formal, quantitative system.

"Subjective ideas from research are quite hard to integrate into the formal, numerical rating structure that we have in the current fire forecasting system," Dr Peace said.

This includes factors like interactions with topography, potential for pyroconvection, potential for three-dimensional interactions, potential for winds to change substantially around a fire, water vapour dry slots, plume development and spotting processes.

"We understand them in a subjective sense, but how do we turn them into some sort of metric which can be incorporated into a risk measure when there actually is a fire?

"I think coupled fire-atmosphere modelling offers an avenue for doing this, because if a series of simulations are run with various thresholds, you can actually find out what the thresholds are for certain phenomena," Dr Peace said.

"When you talk to the [fire agency] operational people, they are very receptive to these sorts of ideas, because it matches what they are seeing on the fireground. They just do not have a way of measuring it.

"But in order to fit the new knowledge into the systems we have now, we need to tie it down to a more quantitative measure. The challenge is how to do it in a sensible way."

Dr Peace said timing is important. Currently, computer speeds do not allow coupled models to run fast enough to be useful for routine operational purposes.

"When you look at computer power and how far it has come in the last five or ten years, we are probably not that far away before the computing power catches up and we can run coupled simulations in real-time," she said.

Dr Heemstra believes there are a number of other significant circumstances where coupled fire-atmosphere models will make a difference.

"It comes down to three key factors," he said.

"Understanding the effects of the [smoke] plume on the local winds, how the plume might affect a wind change and the potential of the plume to generate lightning through pyroconvection."

Dr Heemstra uses the example of how a smoke plume can affect local winds and therefore spot fire behaviour. Fire behaviour analysts will benefit greatly from a much better understanding of when a spot fire will continue with the prevailing winds fanning the main fire front, or when it is more likely to be drawn back into the main fire front, operating under different wind conditions from the prevailing winds.

"There are some really complex interactions that occur in that kind of fire behaviour and hopefully we will get a better insight," he said.

"Spot fires can land a long way in front of the main front. At what point do they start getting drawn back in? Is it 500 metres? Is it a kilometre? Is it 4 km? Just understanding how the plume is affecting local winds is really critical."

How the topography surrounding a fire influences wind speed and direction is also vital.

"The coupled model will also show how the winds around the fire change with the topography. This is a pretty big advantage that we do not have at the moment," Dr Peace said.

"This will give us additional information about spotting processes and how a fire will move along ridgelines and through valleys."

Current atmospheric models are run operationally at around 5 km resolution, but in research mode, the resolution is 200 or 400 metres. Fire models are run operationally at 10's of metres. Models that take an hour to run in current operational use can take half a day at the increased resolution.

"There can be an order of magnitude difference with wind speeds through gullies and along ridges," Dr Peace said.

"This difference has a big impact on how the fire propagates."

The increase in knowledge that will come from this research will inform weather forecasts, which in turn will benefit warning messages about any fire threat.

Dr Peace and Dr Kepert are aiming to conduct case studies to assess the results of the coupled fire-atmosphere work.

"We will do a comparison with what we have done in the past, using three fires from my PhD studies, so there is a benchmark to work with," Dr Peace said.

These case studies will cover two bushfires on South Australia's Kangaroo Island (the D'Estrees Bay Fire and the Rocky River Fire) in December 2007, and the West Australian Layman fuel reduction burn in October 2010.

Dr Peace said the end user support for the work is very encouraging.

"It makes sense with what they see in the real world. Their response has been overwhelmingly positive."

For more information, go to www.bnhcrc.com.au

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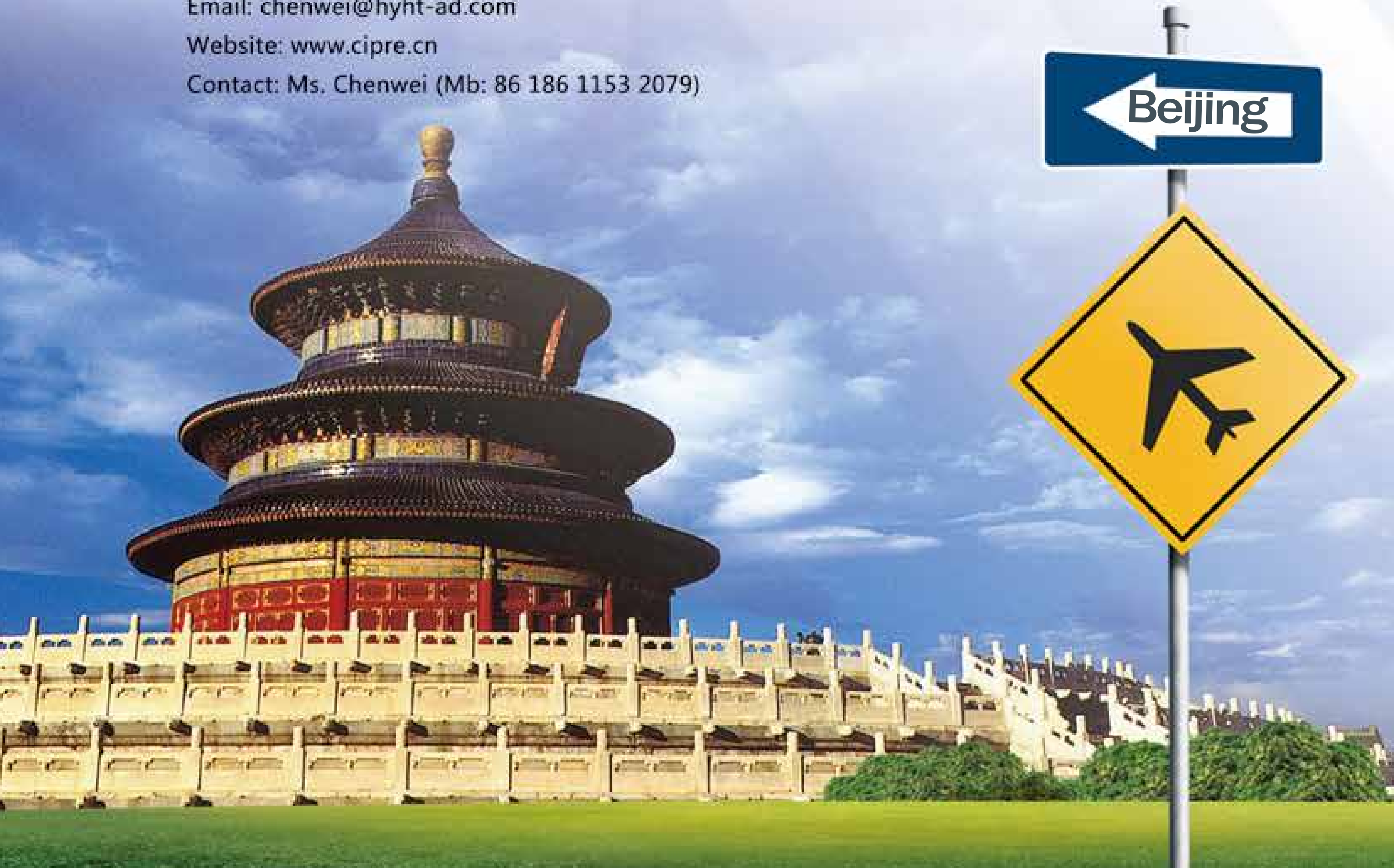


Creating an Above Ground Fire Shelter

Following the disastrous bushfires of 7 February 2009 I was shocked at the significant loss of life. 173 persons lost their lives. The impact of the fires extended far beyond the immediate loss of life to include those who survived the fires and to the relatives and friends of those killed and injured. I think most of the Victorian community was collectively traumatized.

Jeff Godfredson

Jeff Godfredson is Managing Director,Global Safety Solutions Pty Ltd he has a 40 year history with the fire service and fire industry and was Chief Officer of the Melbourne Metropolitan Fire Brigade for ten years.

As somebody who has spent a lifetime in the fire profession I wondered if there was more that could be done to protect those directly in the path of a bushfire. When I was contacted by the Victorian Centre for Advanced Materials Manufacturing (VCAMM) requesting my support for project to see if there was a better way to protect people living and working in bushfire prone areas. I willingly offered my support.

VCAMM were successful in getting a government grant and put together a group of people to look at the problem. The people included in the group came from very diverse backgrounds. They included representatives from:

- Diver Industries (manufacturer of heat shields for the automotive industry).
- EXOVA (Fire Testing Laboratory).
- Frankston Concrete Products (manufacture of concrete products).
- Pyropanel Fire Doors (fire door expertise; joined later in the process).
- Swinburne (Faculty of Science, Engineering and Technology).
- VCAMM (provided facilitator and secretariat).

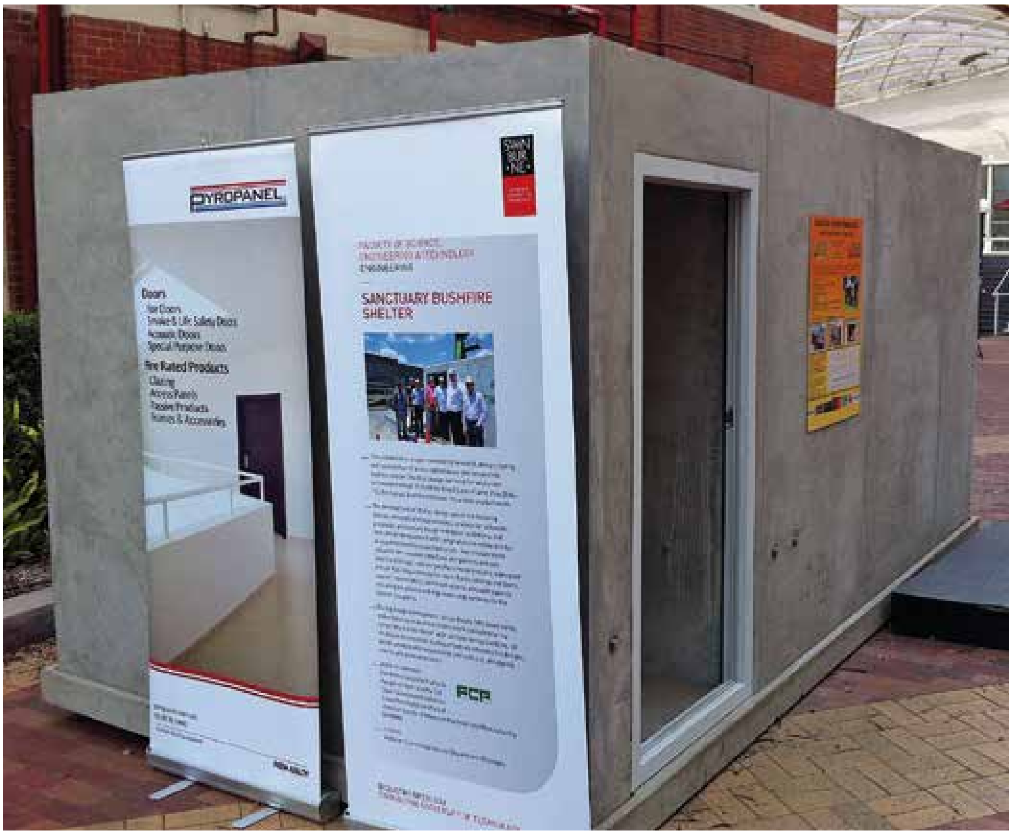
It was an interesting exercise as each participant brought something different to the table. What was surprising was how quickly we decided on an above ground shelter. As professionals in the fire profession know it is not uncommon for a fire refuge/fire separation to be part of a fire protection design. They are included in super high-rise buildings and long tunnels. Hospitals separate floor areas to facilitate horizontal evacuation. Why could we not use these principals in creating a safe place for people caught out in bushfires?

Other reasons for an above ground shelter included the psychological impact of going underground into a “tomb” has a significant effect on some people. Access by a ladder is very difficult for the elderly or people with disabilities. Entering our shelter would be like entering a garden shed. It also avoids the significant drainage/flooding issues of an underground shelter.

From the start we decided to use “off the shelf” components where possible to help keep the price down and to facilitate easy replacement of parts over the life of the shelter. We also wanted to make the shelter as simple as possible with very few moving parts. We all understood the shelter was likely to be in place for decades before being required for use but it had to be able to perform its task at a moments notice.

The next task was design. Following the fires there were people coming out of the woodwork to sell “fire shelters”. These ranged from a hole in the ground with a lid to metal shipping containers and a wide array in between. The Victorian Building Commission quickly saw the evolving problem and issued a set of guidelines and (Private Bushfire Shelter Construction) Interim Regulations 2009, which required anybody installing a shelter to obtain a building permit. They also accredited an underground shelter.

In 2010 the Australian buildings Control Board (ACBC) produced a standard titled “Performance Standard for Private Bushfire Shelters” The latest addition is 2014 and is available free from their



website http://tinyurl.com/p6g54l9 The standard outlines acceptance criteria and some specific requirement.

A suggested design was proposed by Jim Griffin from Diver Industries based on designs they used to minimize the transfer of heat from car exhaust systems to the body of the car. Peter Zigouras from Frankston Concrete Products (FCP) http://www.sanctuaryshelter.com.au and has over forty years experience in the concrete business under took research and came up with a concrete mix which he thought would satisfy our needs and comply with the requirements of the Code.

Sample panels were constructed and independently tested by Exova. To our delight the exterior face of the panels were exposed to high temperatures for an extended time and the heat transference was minimal. The design had exceeded our expectations. We then proceeded to design and construct a full size shelter. Where possible "off the shelf" components were sourced and consisted in the main of two hour rated components such as door sets and, door hardware including locks fittings and closers. . The biggest challenge was the door. After exploring a number of options we found a two hour rated fire door, which had a very low heat transference rating. We contacted the manufacturer and Pyropanel joined our group.

All of the members worked cooperatively adding their own area of expertize. E.g. Swinburne University considering the ergonomics and psychological impact on potential users. A final design was created that consisted of two separate chambers; an inner and outer, each fitted with a two hour fire rated door.

Whilst it is not a requirement of the Standard there was a need to ensure the shelter would be safe for occupants when the shelter was not in use during a bushfire. As the shelter would be gas tight when sealed there was a need to develop and install a ventilation system for use at other times. A number of different designs were considered but finally an under shelter system with inlet and exhaust from both chambers was adopted. The vents are locked in the open position and only sealed when a fire is threatening.

A prototype of the full size shelter was produced and prepared for testing. The shelter could not fit inside Exova's largest test furnace so an innovative solution was found. The shelter was fully assembled on a low loader and the whole system was driven up to the furnace. Construction was then undertaken to seal the furnace to the shelter. The full scale test was undertaken whist the shelter sat on the low loader.

The results of the first test were very encouraging with minimal temperature rise inside the shelter. The doors and all of the hardware continued to function after the test. There were some issues regarding gas levels in the outer chamber which needed to be addressed.

A new prototype utilizing lessons learnt was produced and the tests repeated. We now had the data we needed to support our case for accreditation by the Building Regulatory Control Board. Exova produced the Fire Engineering Report and Swinburne provided the Air Quality Test Report.

Accreditation was granted in July 2014. The Shelter was first shown to the public at an engineering open day held at Swinburne in November 2014. From the very little media coverage we have now received interest from within Victoria, Tasmania, South Australia and Western Australia. A new hydraulic assisted mold will be utilized to manufacture the shelter in large quantities.

In a small way we hope to contribute to the options available for people who live in bushfire prone areas.

For more information, go to www.sanctuaryshelter.com.au

Protecting Fire Sprinklers from the Human Element

Fire sprinkler systems are designed and installed to protect life and property. Actuation of sprinkler heads in the event of a fire is desired, but actuation from damage or other causes is not. So, what protects the sprinklers from us – the human element?

Phil Awker

Phil Awker is Design Manager at Ahern Fire Protection.

Each year, many automatic sprinklers are damaged or compromised through accidents, vandalism, or mischief. This results in unintended discharge of as much as several thousands of litres of water that can damage property or could cause chaos for nearby occupants. Building operations can be shut down for extensive periods of time and when the business interruption or temporary moving and housing costs are added to the costs of the building repairs, the loss can be significant.

Although there have been improvements in recent years regarding the protection of sprinklers during packaging, shipping, handling, and installation, for example the protective plastic guards on sprinkler heads in the shipping box, some sprinklers fail each year due to damage caused by people.

Currently, there are options to minimise the potential damage to sprinkler heads that have already been installed. The most common include the installation of the sprinkler at a location or height where damage is least likely occur, the use of the appropriate "Listed" head guard for the specific sprinkler, fully concealed sprinklers, and institutional style sprinklers. Each option has its pros and cons. However, regardless of the options considered, the human element always enters the equation.

Image courtesy of Ahern Fire Protection

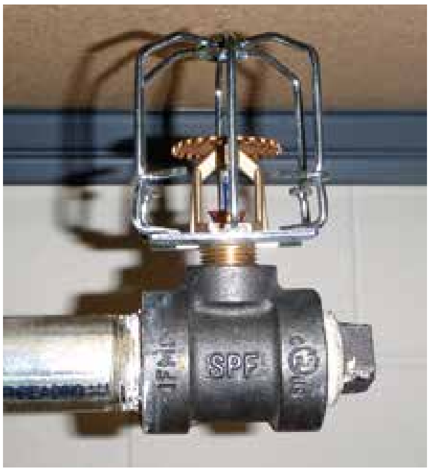
Location and Height

Many installations can be designed where the proximity of the sprinkler head is unlikely to be damaged. For example, sprinklers can be located in normally occupied and/or supervised areas such as offices or retail sales areas, with ceiling heights exceeding 2.4 metres high, and in areas where equipment, storage, or machinery are not an issue. Pendent, upright or horizontal sprinkler heads can be used if positioned correctly in areas where the potential for damage of any kind will be at a minimum.

In most applications sprinkler heads are installed in locations or at elevations where damage is unlikely. However, there are instances where protection of these devices must be considered.

Sprinkler Head Guards

These devices are generally recommended where damage could occur to commercial sprinklers due to activities, operations, the use of equipment such as warehouse forklifts, or machinery, where objects are hit, thrown, kicked or batted as can happen in school locker rooms and gymnasiums, where sprinklers are installed below 2.4 metres above the floor, or in areas with limited or no supervision or where mischief or vandalism could occur. Sprinkler head guards must be "Listed" for use with the automatic sprinkler they are used on. In many cases generic head guards should not be used because they



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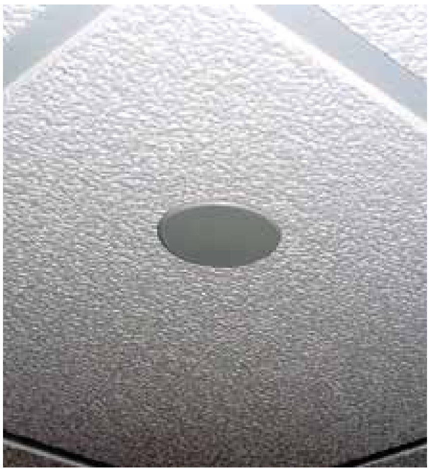

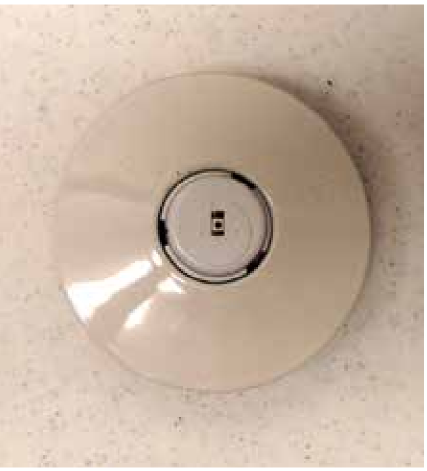

could void the warranty of the sprinkler with the sprinkler manufacturer.

Sprinklers installed below mechanical equipment or ductwork in warehouses and mechanical or service rooms may be prone to accidental damage from occupants. Also, the use of forklifts or other equipment may subject sprinklers to damage. "Listed" sprinkler head guards are generally specified for these applications. A thorough review of building owner requirements and usage should be performed to determine where head guards should be recommended or installed.

Fully Concealed Sprinklers

"Out of sight – out of mind" is what generally comes to mind when using these sprinkler heads. The sprinkler assembly is located behind a plate that is generally flush with the ceiling. Most building occupants do not realise that there is a sprinkler head behind the finish plate and will not give it a second thought. The low profile of the concealed sprinkler may help prevent damage to the assembly as opposed to an automatic sprinkler that is protruding several inches down from the ceiling.

Schools, bathrooms, temporary residential, and minimum security areas are areas where fully concealed sprinklers may be the best choice. Although previously utilised for aesthetic reasons, this type of sprinkler does not draw the attention to itself that a recessed or pendent sprinkler head might. Plus, the lower, almost flush profile of the sprinkler does not lend itself to as much accidental damage. Also, most people are not aware of the automatic sprinkler assembly behind the cover plate so there is less chance for vandalism or malicious mischief.

Institutional Sprinklers

These may be the most misunderstood automatic sprinklers when considered for protection from the human element. When these devices were first introduced, manufacturers referred to them as "vandal-proof". It was discovered, however, that there may not be an automatic sprinkler that is completely vandal-proof. Subsequently the terminology "vandal resistant" was applied to these sprinklers. Certain models, such as the old Star PH series, were standard response sprinklers that were popular for their construction features.

But, when the National Fire Protection Association Standard 13, Standard for the Installation of Sprinkler Systems, required quick response sprinklers in light hazard occupancies, manufacturers had to redesign their institutional sprinklers to meet quick response requirements. This resulted in a design change to the sprinklers that may not be as vandal resistant as their predecessors. However, the selection of any institutional or vandal resistant sprinkler must take into account the usage of the building in each specific room or area and not the building as a whole.

Although designated as vandal resistant and not vandal proof by the manufacturers, institutional style sprinklers are still the choice to consider where individuals could vandalise or consider doing harm to themselves with the assistance of an automatic sprinkler, such as prisons, detention and treatment centres, and maximum security areas. The installation of these devices must adhere strictly to the manufacturers' recommendations or they could fail.

The suspended load (the link break-off weight) for the heat sensors must be taken into consideration, as it varies by manufacturer. A lower weight might be considered where juveniles are present. Also, the sprinkler assembly needs to be securely attached in a manner where there is no movement. A review of the wall or ceiling assembly should be performed for adequacy of the support system and, if necessary, additional supports may need to be provided to comply with the manufacturers' installation recommendations.

In Closing

Part of the challenge for designers is to select the appropriate automatic sprinkler for the specific application. This also extends to the protection of those devices that are not fragile, but need to be treated as if they were, so they are functional and can operate when you need them – not when you do not. The building owner and/or occupants should be consulted when selecting the sprinklers and the proper method of protection prior to the design and installation of the sprinkler system.

This only touches on types of protection and instances where protection of the automatic sprinklers should be considered. Each room or area of the building should be reviewed to help determine where and what type of protection could be utilised. Input from the building owner, occupants, or end users should be considered when evaluating how and where the human element will affect the sprinkler protection requirements. Although the final decisions may not be perfect – if someone really wants to damage a sprinkler, they will – prudent choices will minimise accidental or intentional damage to these devices.

For more information, go to www.jfahern.com.

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ADVERTISERS' INDEX

Advanced Electronics	**02**
APCO Australasia	**22**
Apollo Fire Detectors Ltd.	**32**
Australian and New Zealand Disaster and Emergency Management Conference	**29**
Bauer Compressors Asia Pte Ltd	**43**
Bio-Ex S.A.S	**51**
Bristol Uniforms Ltd.	**67**
Bullard Asia Pacific	**40**
China International Protection and Rescue Exhibition 2015	**83**
Coltri Asia Pacific Co Ltd.	**51**
Cutters Edge	**71**
Dafo Fomtec AB	**48**
DQE, Inc.	**79**
Dr. Sthamer Hamburg	**65**
DuPont Fire Extinguishants	**IBC**
Dynax Corporation	**04**
Fike Corporation	**58**
FFE	**57**
Firemiks AB	**77**
Fire-Shield AG	**56**
Firetrace International	**09**
Kochek Company Inc.	**53**
Leader S.A.S	**43**
Hainsworth	**21**
HD Fire Protect Pvt Ltd	**58**
Holmatro Rescue Equipment	**80**
Husqvarna Far East Co., Ltd.	**73**
Hytrans Systems b.v.	**53**
Janus Fire Systems	**79**
LHD Group Hong Kong Ltd.	**36**
Pacific Helmets (NZ) Ltd.	**39**
PAB Akrapovic	**74**
Performance Advantage Company	**17**
Reliable Fire Sprinkler (UK) Ltd.	**13**
Rotarex S.A.	**54**
Saphire Complete Training Concepts	**45**
Sicor S.p.A.	**68**
Task Force Tips, Inc.	**IFC / 01**
Teikoku I-Sen Co.	**62**
Tempest Technology Corporation	**66**
TenCate Protective Fabrics	**06**
Texas A & M Emergency Services Training Institute	**45**
The Protectowire Co., Inc.	**61**
TLX Technologies	**60**
Tyco Fire Protection Products	**OBC**
Xtralis	**25**
Yone Corporation	**47**
Ziamatic Corporation	**64**

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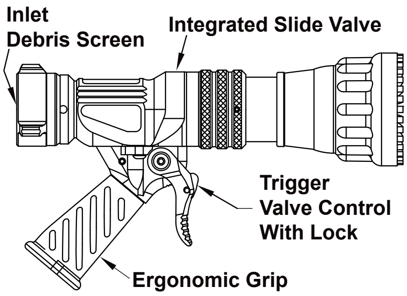

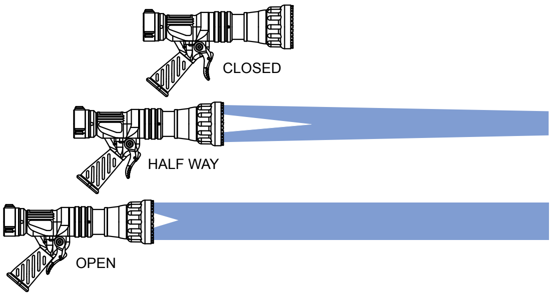

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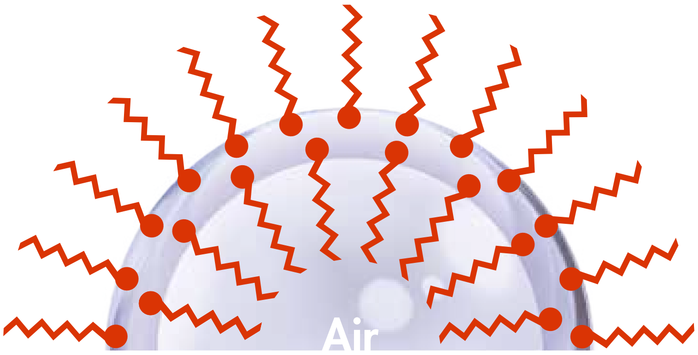


Fluorine-free foam bubble

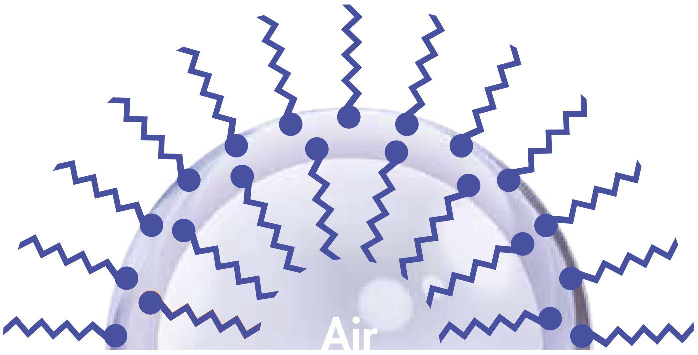
F3 Foam **attracts** hydrocarbon fuels

Hydrocarbon surfactant
(Hydrocarbon tails are fuel-loving)

FORCEFUL F3 APPLICATION:

- **Foam attracts fuel**
- **Foam becomes flammable**
- **Foam has reduced performance**
- **Foam use is increased**

Need proof? See F3 foams on fire:



Fluorinated foam bubble

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Fluorosurfactant
(Fluorocarbon tails are fuel-hating)

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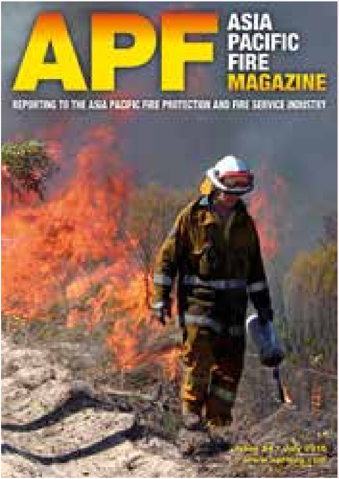
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Cover image: Firefighter using a drip torch to start a fuel reduction burn. Photo courtesy of David Bruce, Bushfire and Natural Hazards CRC.

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Contents

JULY 2015

REGULARS

5 Editors Comment
7 Industry Comment
8 News and Profiles
83 USAR Buyer's Guide

FEATURES

23 Product Compliance – the Confronting Reality
30 The Importance of Listing Sprinkler Equipment
33 Mine Rescue Competition, Testing Rescue Crews
36 PPE/PPC – the Last Line of Defence
39 Voice Communications, without Limitations
44 AFAC 2015 Exhibitor Showcase
66 Taking Photos on an Australian Fire Ground
69 A Common Operating Picture for Fire Response
75 Petroleum Storage Tank Facilities – Part 1
80 USAR Advances their Technology Capability
93 A Century of Natural Disasters – What are the Costs?
96 Improving Safety and Performance on the Fireground
100 Pedestrian Modelling in a Fire Environment
104 To Burn or Not to Burn?
108 Standards Australia – Playing Our Part in Fire Safety
110 Understanding the Basics of RoIP and VoIP
112 Advertisers' Index

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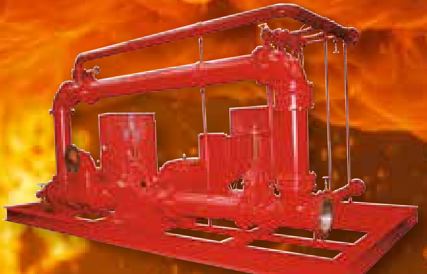

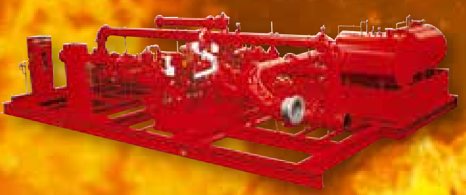

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It's Time to Face up to the Fact that Climate Change is Upon us

Climate change is the biggest single issue confronting fire services and disaster management agencies. I can hear those sceptics now saying here he goes again on his hobbyhorse. Yes, I'm passionate about it and I make no apologies for standing on the toes of climate deniers. We don't have time to be Mr/Mrs nice.

Neil Bibby
ASFM, FAICD, MIFireE
Editor

Most agencies are attempting to prepare for a different future but policy makers are slow in realising the urgency of the situation.

What we know with certainty:

- CO_2 is up from 320 ppm in the 1960's to 400 ppm now and is higher than any other time since 800,000 years ago
- Land and sea temperatures are rising
- Ocean levels are rising

The predictions that these will continue to increase are 99% in scientific terms. I wonder if a sceptic would get on a plane that had a 99% chance of crashing?

This is about science, not belief systems. If you jump off a cliff, gravity doesn't care about your belief system.

Most of you know what this means for emergency services and the community, but let me spell it out in black and white. More days of extreme heat (best case it will only double by the 2030's) will see more forest fires endangering communities, causing smoke haze, particularly in Asia and draining volunteers of their goodwill. Heat exhaustion on these hot days badly affects and kills the elderly and young, putting additional pressure on ambulance services and hospitals. To add to these increases in temperature, El Niño events, such as the one forming in the Pacific now will bring drought conditions with higher temperatures. Sea level rise will see greater devastation for our civil defence agencies to combat. It will not just be when storm surges occur, but every king tide, year after year.

Then there is some evidence that cyclones may occur more often and be more intense as well as moving further south. A combination of all these changes will impact on all of our region. Poor and rich nations will both suffer though low lying Pacific islands nations will bear the brunt of it.

We may not be able to change the CO_2 levels in the short to medium term and it may never go back to 1960's levels, but by accepting this is going to happen and planning for the higher levels of impact of these changes to our environment we can mitigate the effects on the community and pressure on our emergency services. We must start now on a grand scale fully coordinated across our region in the full knowledge that this is not a maybe.

In the next issue I will comment on how emergency services depend on the safety industry for support and how this industry is one of the most innovative industries in the world today.

For further information, go to www.apfmag.mdmpublishing.com

By accepting this is going to happen and planning for the higher levels of impact of these changes to our environment, we can mitigate the effects on the community and pressure on our emergency services.

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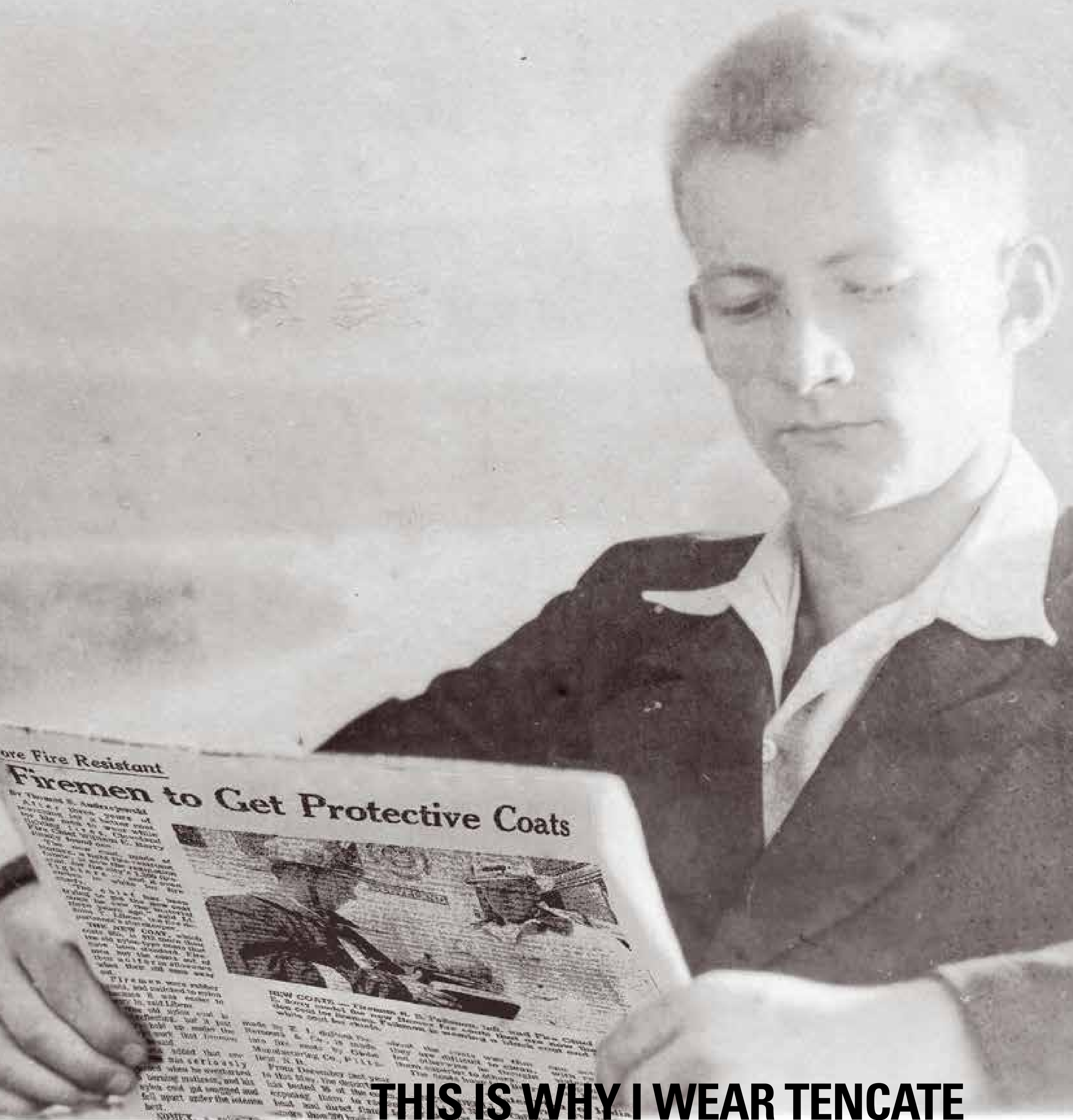
ore Fire Resistant
Firemen to Get Protective Coats

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We began making fabric in the United States in 1925. We were the first to deliver flame-resistant fabric for U.S. firefighters in 1970. We proudly continue this tradition today. Learn more at TenCateFabrics.com/Ninety

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Building Product Compliance – how Big is the Problem?

That is the alarming issue confronting the building and construction industry in Australia today.

Scott Williams
FPA Australia CEO

The recent high-profile case regarding non-compliant aluminium cladding which helped to fuel a dangerous apartment fire in Melbourne's Docklands in November 2014, has shone the spotlight on an issue that the industry has known about for years: that appropriately designed and tested products are being substituted for poor quality imported alternatives.

The response of the Metropolitan Fire Brigade (MFB) to this issue has been outstanding, however the problem is in no way limited to just aluminium cladding. In October 2014 the Australian Competition and Consumer Commission (ACCC) recalled imported electrical cable, which was installed in up to 40,000 premises Australia-wide. This cable could become a fire hazard in as little as two years after installation.

These are just two examples of a much broader systemic failure of building legislation which poses enormous fire risk to the community and urgent action is needed.

There is an expectation in a first-world country that buildings will be compliant and safe. Yet, in the building and construction industry it is widely known that non-compliant products are bypassing the approval process and being installed.

At the Association we believe the problem exists for three main reasons:

1. Lack of national risk based product compliance framework
2. lack of understanding by building practitioners about the requirements
3. lack of adequate surveillance, auditing and enforcement from the regulators

These issues are explored in this edition in 'Product compliance – the confronting reality' and many of these important issues were also raised at the *Fire Australia Conference and Exhibition* on Queensland's Gold Coast on 25–26 March.

There was much discussion focused on the need for renewed vigilance across all parts of the supply chain in the building and construction industry. At the conclusion of the conference, the following key resolutions were reached:

1. FPA Australia supports the establishment of a clear and meaningful product compliance framework that is aligned to the risks. Without such a framework, the safety and performance objectives of Australian construction regulations and standards are unlikely to be delivered and the community is at risk.
2. FPA Australia has resolved to constitute a Fire Products Reference Group for the purpose of establishing best practice technical schedules for the assessment and certification of fire protection products for the Australian market.
3. FPA Australia will establish a product listing scheme (FPAL) that provides a single point of reference to validate fit-for-purpose products.

By honestly and openly identifying the issues and adopting the conference resolutions, we can go some way to providing meaningful solutions.

However, treating the risk of non-compliance will only happen through the collaboration of all stakeholders. Until the building and construction industry and regulators acknowledge the extent of the problem, it will remain an immeasurable and untreatable issue for our community.

If this status quo is allowed to remain, the potential for large scale fire incidents due to product non-compliance will continue.

For further information, go to www.fpaa.com.au

News

Magirus Delivers 13 Foam Tank Pumpers

Magirus has recently delivered 13 of its SLF 100/80 heavy foam tank pumpers to China for deployment in the Liaoning province. The delivery successfully continues the over 100-year-old partnership between Chinese firefighters and Magirus. These fire trucks are built on 4-axle, 425 kW / 578 HP Mercedes Benz Actros 4158 chassis with semi-automatic transmissions. The standard cab has space for a crew of 1+2. The superstructure is built of the modular Magirus BULL construction. AluFire 3 tank and superstructure modules are assembled into superstructures that are custom-tailored to the customer's needs.

The vehicles in the Liaoning province are equipped with an extinguishing agent tank that holds 18,000 litres. 12,000 litres of these are reserved for water and 6,000 for foam compounds. Automatic tank level regulation simplifies the operators' work.

The Magirus MPN 700-3 firefighting centrifugal pump is constructed of seawater-resistant bronze alloy. It can pump as maximum 10,000 litres per minute at 10 bar. The MPN 700-3 is controlled by user-friendly Magirus HMI units that are located in the cab and pump room and are equipped with convenient colour displays.

Six pressure outlets, two electrically retractable quick-attack hose reels as well as a roof monitor are available. The water/foam monitor has an output of 4,000 or 8,000 litres per minute. The monitor can be controlled using a joystick in the cab or on the superstructure roof, or via a wired remote control.

The powerful Magirus MDZA 600 foam-proportioning system controls the correct ratio of foam to water. The hydraulically driven piston-pumps in the foam system can add up to 600 litres of foam compound per minute. Proportioning rates of 1-3-6 % are calibrated in the Magirus HMI control system according to the customer's needs.

In addition to breathing apparatuses and other protective clothing, the equipment compartments provide robust mounting brackets for armatures, suction and pressure hoses as well as many types of nozzles and other fire-fighting devices.

Powerful LED technology for illuminating equipment compartments and the surrounding ensure safe working conditions around the vehicle. Warning beacons in the front and LED warning lights in the rear, all in red, secure the vehicle. An acoustic back-up alarm and Magirus rear-view camera system complete the safety equipment on the superstructure.

For further information, go to www.magirusgroup.com

First Intrinsically Safe Level Indicator

After four years of research and development Link Instruments Ltd are pleased to announce the arrival of their latest level indicator intrinsically safe.

Listening to our clients needs is essential for the development of any new product, with safety being of paramount importance in intrinsically safe areas, our clients were finding that testing in these areas involved lengthy shutdowns, supplementary man hours resulting in extra cost and lost time and asked if we could find a solution.

The ULLC –IS is certified to Group II Category 2G Ex ib IIC T4 Gb allowing it to be used for all Zone 1 areas. The unit is simple to use and requires no calibration, it has been completely redesigned and as with all Link Instrument products it is built in house following stringent QA procedures and testing. Our testing area ensures that each instrument is tested against a range of cylinders containing different mediums before finally released to our clients.

The unit itself has a robust metal body and a display that clearly indicates when the liquid level is found. Using ultrasonic level detection allows a large number of cylinders to be tested rapidly and precisely without the need to dismantle them from the fire system. The unit is capable of detecting a large variety of extinguishing agents including NOVEC, CO2, FM200 and Halons.

For multi-banked cylinders the complete kit has a bespoke extension rod allowing access to second and third row cylinders, the sensors have a removable head allowing ease of cleaning for instrument maintenance.

For further information, go to www.linkinst.com

Task Force Tips

Introducing the New Impulse Trigger Control Valve

The addition of a trigger valve control to a firefighting nozzle, while not particularly revolutionary in the global market, when integrated into Task Force Tip's unique slide style shutoff valve does offer a level of firefighting stream performance never before realized.

Unlike common twist or ball style shutoff designs, the slide valve provides total nozzle operator flow control while maintaining a hard hitting, turbulence free straight stream throughout the nozzle's rated flow and pressure range. The primary reason for this is the unique ability of the slide valve to regulate the fire flow without disrupting the stream passing through the nozzle. In any operator selected valve position, internal turbulence is eliminated providing maximum stream reach and penetration even when the flow is restricted based on operational fireground conditions.

Traditionally, ball and even the unique slide style shutoffs have been controlled by a lever or horseshoe shaped handle that incorporates valve operation into the top of the nozzle. Common practice was to hold the nozzle's pistol grip with one hand, supporting the weight of the hose and absorbing any nozzle reaction with that arm and the body, while using the other hand to control the valve, change gallonage selections, flush debris from the nozzle, or choose the appropriate stream pattern for protection or suppression.

Image courtesy of Task Force Tips

Today, when the IMPULSE trigger valve system is integrated into a slide valve nozzle, operator flow control and nozzle stabilization can be achieved with a single hand allowing the other hand, without removal, to securely control stream pattern selection, flush or gallonage selection. Additionally, the trigger system automatically dampens the closure of the valve preventing unintentional and unwanted pressure spikes in the hoseline. Unlike common shutoff designs that remain open and flowing when accidentally dropped, the IMPULSE system's unique design immediately moves the nozzle's valve to the closed position preventing personal injury or the damage that often results from an out of control nozzle.

Emergency response agencies adopting the tactical use of "pulsing" as part of their interior firefighting operations have been especially accepting of the new valve operational controls. When integrated into the dozens of automatic pressure control pulsing nozzles offered with a slide valve, volume and water droplet size can be optimized for maximum cooling and suppression performance. From the first opening of the valve to full closure, these nozzles deliver consistent stream velocity from the first uniform droplet to the last.

Available as an option on 10 different series of Task Force Tips fixed, selectable, and automatic pressure control nozzles, the IMPULSE trigger valve system offers an optional trigger lock mechanism to hold a selected flow, but also allows closure with just a simple touch of the trigger. The unique ergonomic pistol grip is easily color coded for identification and compliments the overall design by greatly reducing nozzle operator fatigue.

For further information, go to www.tft.com

Packexe adds The Edge – SMASH to Rescue Line

Used by Fire Services across the UK and distributed in over 20 countries around the world, Packexe® SMASH is regarded by all who use it as an essential part of extrication kit. The Time Critical Glass Management product ensures that vehicle glass is managed while extrication is taking place. With the application of Packexe® SMASH, the glass is securely held, allowing emergency personnel to cut through vehicles without risk of injury from flying glass, dust and offers protection for any trapped patients inside the vehicle.

Packexe's® latest rescue innovation is The Edge – SMASH: a hand-held version of the SMASH roll and dispenser with all the existing benefits of SMASH, in a compact size. Perfect for rescuing in tight spaces, small storage spaces, work on small vehicles, or who need extra portability from their products. With a low initial cost and low-cost refill rolls, it is also ideal for teams on tighter budgets. Each roll is 50m and will cover around 7 car windows. Rolls are quick and easy to replace, meaning that no time is lost even if the roll runs out.

Packexe is also seeing continuing popularity with Sharpswrap, for rapid sharps protection. This simple, portable and easy to apply product can be applied to damaged car parts in seconds, making extrication situations safer for both staff and patients.

For further information, go to www.packexe.co.uk

New Head-to-Toe Marine Firefighter PPE

As part of a wider programme to introduce a range of products incorporating the latest fabrics and PPE materials, Bristol has upgraded its protective clothing range for marine firefighters. The new head-to-toe range includes fire coat and trousers, helmet, boots and gloves which are all certified to MarED standards.

Operating internationally, meeting the needs of marine firefighters requires specialised clothing which will protect firefighters at sea in a variety of situations but which focus primarily on offshore oil and gas exploration rigs and production platforms as well as shipboard fires arising from collisions and cargo fires and explosions.

Marine firefighter clothing comes in the form of Bristol's Fleet Suits, which have been supplied to many of the world's leading oil and gas exploration and production companies operating in offshore locations as different as the North Sea and North Atlantic to ocean operations off West Africa, South America and Eastern pacific as well as the Arabian Gulf. To meet the exacting standards demanded by the operating companies, the PPE supplied is routinely required to meet the European Marine Equipment Directive 96/98/EC (MarED) as well as the relevant EN Standard with enhanced accreditation through Wheelmark Certification.

Fleet Suits to meet both EN469:2005 Levels 1 and 2 both include a yellow lightweight flame retardant outerlayer. With a fleece lined high collar, plain cuffs and combination zip and velcro front fastenings, the coat is lightweight and ergonomically efficient allowing ease of movement in frequently difficult operating environments. With an upgraded range of compatible garments, all MarED approved, now part of the head-to-toe ensemble, the complete kit includes a helmet incorporating an integrated internal goggle visor and exterior visor manufactured to EN443 and EN14458. The new rubber fire boot includes a safety toe cap and anti-perforation mid-sole and is manufactured to EN ISO 15090 Type 3. The new structural glove is a combination of a silicone coated Kevlar palm with a Nomex® back incorporating knuckle protectors married to a Goretex® moisture barrier and manufactured to meet EN659:2003 + A1:2008 + AC:2009.

Commenting on the introduction of the new range of firefighter garments, Richard Cranham, Bristol's International Sales Manager said, "We have undertaken a major review of available compatible garments and, after lengthy trials, have selected a new helmet, gloves and boots for their performance, comfort and high levels of compatibility with our Fleet Suit design. This head-to-toe combination should continue to offer marine firefighters, deployed in some of the most hostile operating conditions experienced by firefighters anywhere in the world, the best available protection coupled with good ergonomics, durability and wearer comfort"

For further information, go to www.bristoluniforms.co.uk

Bullard

Leaders in Thermal Imaging Cameras and Rescue Helmets

Market Leader

Bullard has remained a manufacturing leader in its markets for more than 117 years. The Company maintains its competitive edge through advanced engineering technology, adopting the principles of 'lean' manufacturing and offering value-added services. In addition, Bullard utilizes cross-functional teams to develop the most sophisticated, technologically-advanced products designed with worker safety in mind.

We are a Company that knows the specific needs of the fire service. Bullard Thermal Imagers and Fire and Rescue Helmets reflect that knowledge and experience. With Bullard products, you'll find the ultimate in toughness and durability. You'll also find extraordinary service and the most innovative designs.

📷 Image courtesy of Bullard

Fire Helmets

Bullard entered the fire service market with the introduction of its first fire helmet in 1930. Since then, Bullard has led the market in product safety with the development of the first fiberglass fire helmet in 1947, followed by the first NFPA-approved thermoplastic fire helmet in 1983. In 2009, Bullard introduced TrakLite®, the industry's first integrated helmet lighting system that blends engineering, functionality and safety to help firefighters see forward in dark or smoky conditions. Bullard offers a full line of fiberglass and thermoplastic helmets for Structural, Air Rescue, Rescue and Wildland applications.

Thermal Imagers

Bullard introduced its first high-resolution thermal imager to the fire service market in 1998 with the innovative Bullard TI. This breakthrough in thermal imaging technology quickly secured Bullard's market position as the industry's leading thermal imaging manufacturer. Since then, Bullard has equipped firefighters with thermal imagers that offer ultra-high resolution, widescreen display, digital zoom, Electronic Thermal Throttle® and Super Red Hot colorization.

The X Factor Series is Bullard's newest line of thermal imagers. X Factor thermal imagers are enhanced with the latest state-of-the-art infrared engine technology offering the fire service the highest image quality and performance on the market.

Bullard Tough

More than a moniker, Bullard Tough is an enduring legacy. With tens of thousands of firefighting thermal imagers in active service, Bullard stands behind our commitment of engineering the toughest, most reliable thermal imagers in the world. That's why at a field evaluation, trade show event, or personal sales call, you'll see our team demonstrate this toughness by throwing, heating, and immersing our thermal imagers. After all, a thermal imager is only as good as its ability to work reliably in the field. That's what Bullard Tough is all about.

Family-Owned Company

Headquartered in Cynthiana, Kentucky, Bullard is a fifth-generation family-owned company led by its President and CEO Eric Pasch and Chairman of the Board, Edward "Jed" Bullard. The Company's products are available throughout the world from a network of distributors operating in most major country markets. Bullard maintains sales offices in Europe and Asia in addition to its headquarters in Kentucky, USA.

For further information, go to www.bullard.com

Incheon Airport Selects World-Class Oshkosh Striker ARFF Vehicles

Oshkosh Airport Products Group, LLC, an Oshkosh Corporation company, placed a matching pair of Oshkosh® Striker® 8 X 8 vehicles into service at Incheon International Airport (IIA) in South Korea. The airport already had two Striker 6 x 6 vehicles on duty and, when the airport's growing traffic and footprint required the addition of two larger apparatus, IIA again turned to Oshkosh.

"We are honored to be chosen, once again, by Incheon International Airport to provide Oshkosh Striker vehicles for this remarkable complex," said Jeff Resch, Oshkosh Airport Products Group vice president and general manager. "Sales of the Oshkosh Striker continue to accelerate in countries throughout the Asia Pacific region, and that's a testament to Oshkosh performance, reliability and support after the sale."

The matching pair of Oshkosh Striker 8 x 8 vehicles for IIA each feature a 950 horsepower engine with electronic fuel management, Oshkosh TAK-4® all-wheel independent suspension for superior ride quality, a rear steering system (to articulate the rear wheels for enhanced maneuverability), and a 30 degree angle of approach and departure. The wheelbase is 6,782 mm (267 inches) and the overall length is 13,589 mm (535 inches).

Inside the cab is seating for five firefighters, a tilt-telescoping steering wheel column, center console mounted turret controls, heated and power adjustable outside mirrors, air conditioning, and 7.2 square meters of glass area with overhead mounted windows for unmatched outward visibility.

The firefighting system includes a 10,000 lpm (2642 gpm) single stage pump, a 17,033-litre (4,500 gallon) water tank capacity, a 2,385 liter (630 gallon) Aqueous Film Forming Foam (AFFF) concentrate tank, and a 250-kilogram (550 pound) dry chemical system delivered through a dry chemical hose reel mounted in an upper right side compartment. The vehicle offers a structural firefighting control panel and two 64mm (2.5 inch) discharge lines, one on each side of the truck. The vehicle's primary turret is a roof-mounted, electric joystick controlled unit that can rotate 135 degrees on either side of center and elevate 45 degrees above horizontal. A secondary turret is mounted on the front bumper, and five undertruck nozzles protect the underside of the vehicle.

For further information, go to www.oshkoshairport.com

Tempest Technology Corporation Introduces New Delivery Initiative

Further strengthening the company's focus on service and support, Tempest Technology Corporation recently unveiled its new delivery initiative, what they're calling the 3/3 Program.

Designed to provide guaranteed shipping and delivery times, Tempest's 3/3 program promises that nearly all stocked items are shipped within three days of order placement and built to order items are shipped within three weeks.

Since Johan Gidstedt's hiring as President of the company, much of Tempest's continuous improvement efforts have been focused within its production and manufacturing operations, allowing for the 3/3 program to become a reality.

Johan Gidstedt had this to say about the new 3/3 program, "Over the last couple of years we have reviewed almost every aspect of our operations, which in turn helped us uncover ways to increase efficiency. We are very proud that the result of this work now benefits our customers in the form of market leading order fulfillment times and on-time delivery performance."

For further information, go to www.tempest.us.com

ANSUL Fire Detection
Prepare for the Worst, Protect with the Best

According to the National Fire Protection Association (NFPA), mining and mineral processing facilities run one of the higher fire hazards that potentially put personnel, equipment and buildings in danger. Extreme environments such as underground mining also pose a high risk for fatalities and injuries. Fire events lead to damaged equipment resulting in costly downtimes that negatively affect the overall business.

With all of these risks in mind, it is important to ensure adequate fire detection and suppression systems are installed on mobile equipment.

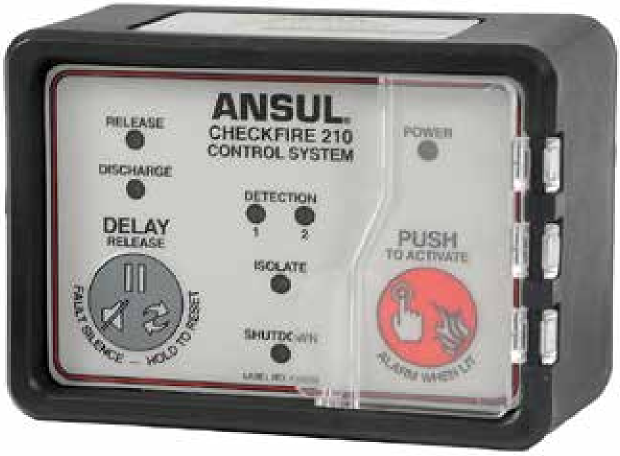
A holistic approach to fire protection for mining vehicles begins with effective fire detection and actuation to control and suppress flames in seconds. A robust and dependable detection and actuation system, such as the ANSUL CHECKFIRE 210, helps provide 24-hour protection of equipment in extreme environments.

Used with an ANSUL LVS, A-101, or Twin Agent Vehicle Fire Suppression System, the CHECKFIRE 210 is engineered to to stand up to extreme operating environments. This versatile system is designed to provide detection, alarm and fire suppression system actuation for mobile applications like hydraulic excavators, haul trucks, wheeled loaders, dozers and graders.

One of the hallmarks of the CHECKFIRE 210 system is its flexibility in protecting multiple hazard areas. Featuring color-coded, plug-and-play connectors, the system is equipped with two, independent detection circuits configurable for various options including single-zone detection, two-zone detection, cross-zone detection, discharge pressure feedback monitoring or alarm only.

Detection is the critical first step in successfully dealing with the threat of fire. The CHECKFIRE 210 offers two highly-reliable forms of detection used individually or in combination. Linear Detection Wire consists of spring-steel conductors separated by a heat sensitive insulator. At the temperature rating of the wire, 356°F (180°C), the insulator melts and the two conductors make contact, sending a signal to the detection module, which signals the control module to actuate the fire suppression system. With Spot Thermal Detection, the thermal detector contacts close and signal the control module to initiate fire suppression when the temperature reaches either 250°F or 350°F (121°C or 177°C) depending on the model selected.

Upon receiving a fire detection signal, the display module activates the release circuit, which is capable of actuating up to 10 agent tanks via electronic actuators mounted directly onto expellant gas cartridges. The system can also be actuated manually by either the manual activation button on the display module itself or electric manual actuators used remotely from various locations on protected equipment. The display module can be mounted in the dashboard or surface mounted utilizing a swivel bracket. Through communication with the display module, operators receive continuous system updates, and operator input commands go directly to the Interface Control Module (ICM). The system programming may be accomplished using the manual programming button and indicator LEDs or by using a computer with the ANSUL CHECKFIRE 210 Programmer software communicating through the micro USB port.



Images courtesy of Tyco

It is crucial to equip mining vehicles with integrated fire suppression systems to avoid expensive repairs and keep insurance costs down, and at the same time, avoid serious, life-threatening injuries.

Complimenting pre-engineered fire protection systems, ANSUL RED LINE Cartridge-Operated Fire Extinguishers provide powerful portable fire protection in tough mining environments. These highly mobile extinguishers offer a robust, quick-response option for one person operation. These premium fire extinguishers are designed for superior performance in high-risk industries and are easy to service with on-the-spot recharge. Tough, carbon steel shells are designed to resist impact, vibration and corrosion to endure harsh environments.

It is critical that mining professionals take a holistic approach to fire protection by incorporating the most advanced technologies in detection, actuation and fire suppression such as dry chemical, dual agent, clean agent and portable solutions to help save time, money and ultimately, lives.

For further information, go to www.ansul.com

VESDA by Xtralis Protects over 250 Racks at Vocus Melbourne Data Centre

Vocus Communications is a leading supplier of telecommunications, data centre and high bandwidth connectivity in Australia and New Zealand. Their flagship data centre is set in the heart of the Melbourne CBD and is also the most recent Vocus facility to be built in Australia, with an additional 10 data centres spread across the ANZ region. This new data centre is a premium facility specifically designed for businesses requiring the highest level of connectivity, power density, performance and security.

The Challenge

Providing adequate smoke detection in a data centre facility is often a challenge in itself but especially in a facility within a multi-tenanted building. Business continuity is vital and Vocus customers, including some of the leading telecommunication and wholesale providers, expect superior connectivity, premium and uninterrupted performance. Even a small amount of smoke can cause corrosion to mission critical equipment, resulting in disastrous consequences and service disruption to their customers.

The data centre is designed for 250 racks capable of supporting up to 30kW of power and cooling per rack via a hot aisle containment cooling methodology. This leads to a large amount of IT equipment stored inside the facility, which presents an increased fire risk due to a higher heat density. High airflow and air pressure also dilutes smoke dispersion into the environment, making very early smoke detection extremely difficult

The Solution

VESDA was selected for its reputation in reliable and very early smoke detection. VESDA also protects other Vocus data centres throughout Australia where it continues to perform successfully. VESDA has previously detected incidents of power supplies failing inside the facilities detecting the small traces of smoke generated allowing the staff enough time for investigation and to mitigate any possible fire threat.

VESDA VLC (LaserCOMPACT) and VLF (LaserFOCUS) units were installed in the world class leading Melbourne data centre to provide protection in general areas and Communications rooms, while a VESDA VLS

(LaserSCANNER) unit was utilised for individual pods in data halls due to its multiple-zone addressability. To accommodate protection of the hot aisles and the need to comply to AS1670.1 standards and Xtralis guidelines, the design incorporated sampling points in the hot aisle sections as well as the open area ceiling. With any potential smoke or fire threat VESDA is able to locate the smoke at the incipient stage and provide a

very early warning response so that the incident can be attended to early, allowing time to respond

accordingly and avoiding the escalating consequences and potential damage.

The Outcome

The design of the VESDA system allowed for a high level of sampling in all areas of the data center including the hot aisle and above ceiling sections, providing an exceptional level of very early warning smoke detection. VESDA is integrated with the dry pipe fire suppression system in the facility to initiate suppression activation if required. VESDA's extremely broad sensitivity range and ability to program multiple levels of alarm according to the level of the threat enables the release of suppression at the most opportune time and to minimize any unnecessary costs arising from early or unnecessary suppression activation.

VESDA is now providing very early warning smoke detection in all Vocus facilities across Australia. Vocus can continue to provide superior, reliable and efficient service to its customers with the knowledge and assurance that VESDA is protecting their mission critical facilities 24/7.

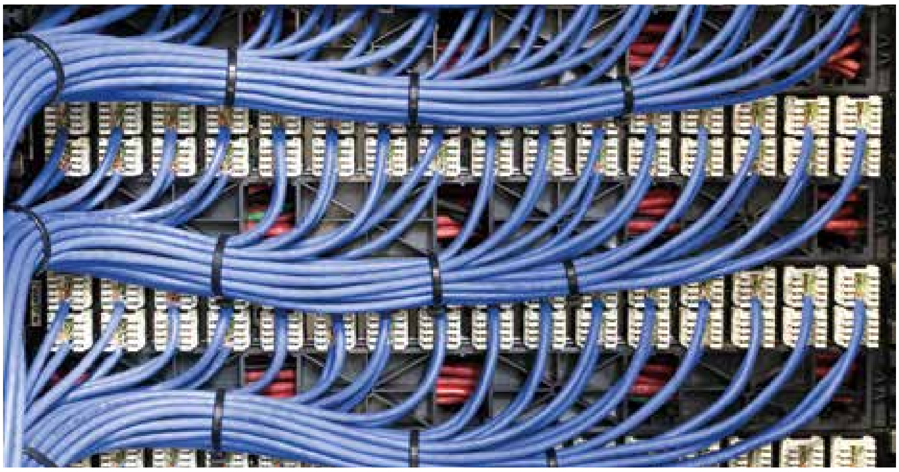


Image courtesy of Xtralis

About The Customer

Vocus Communications is a leading supplier of telecommunications, data centre and high bandwidth connectivity solutions in Australia and New Zealand. The company owns and operates a global telecommunications network connecting Australia and New Zealand to the global Internet backbone in the USA and utilises its domestic network to provide telecommunications services to ISP and telecommunications markets. Vocus' additional telecommunications services also include data centre and dark fibre solutions

For further information, go to www.xtralis.com

MSA Awarded NSW Supply Contract

MSA has announced that its Australian affiliate has been selected as the preferred supplier of new Structural Firefighting Helmets and In-built Communication Systems to Fire & Rescue NSW (FRNSW). This tender for firefighter helmets is one of the largest of its kind in the world.

In the coming months, MSA Australia will supply the Gallet F1 XF Structural Fire Helmet to more than 6,800 fire officers located around New South Wales. The new equipment features in-built radio technology and lighting, which provides firefighters with greater protection and clearer communications during emergency situations. The new helmets enable firefighters to clearly communicate with each other, even when wearing self-contained breathing apparatus.

"We are very honored and humbled to have this opportunity to help protect those who protect us each and every day," said Victor Vendetti, Managing Director for MSA Australia.

The new helmets also provide firefighters with greater protection from heat and falling debris. In addition to an integrated communications system, the F1 XF Helmet includes other innovative features such as lighting and adjustable eye protection.

"The NSW Government is committed to ensuring that our firefighters have the best equipment available to them, and has committed more than $7 million to this project," said Stuart Ayres, Minister for Police and Emergency Services.

"An extensive process was undertaken to identify the best product on the market and we know that we've achieved a great result," Fire & Rescue NSW Commissioner Greg Mullins said. "Fire officers have to deal with life-threatening situations on a daily basis, and they deserve the best protection money can buy. What's more, the new 'jet style' helmets look quite different, and the level of protection they provide is a generation above the current style of helmet, first adopted in 1993."

Image courtesy of MSA

The in-built radio communications equipment means that it will be easier for officers to hear each other at emergency scenes and to communicate about complex firefighting and rescue operations – this can quite literally mean the difference between life and death.

For further information, go to www.MSAsafety.com

VESDA® ≡™

Sets a new standard for superiority.

With over **850,000 systems** already in more than **350 applications** around the world, it's no wonder why IHS Technology reports Xtralis as the leading supplier for aspirating smoke detectors globally. If you're not specifying **VESDA**, why not? – find out what other specifiers already know.

To learn more schedule a **Lunch & Learn today** at www.xtralis.com.

IHS Technology
The World Market for Fire Detection and Suppression Products - 2014 Edition

According to IHS, for the 8th consecutive year, Xtralis is the largest aspirating smoke detection company in the world. **And the fastest Growing.***

*From the latest IHS Technology report titled "The World Market for Fire Detection and Suppression Products – 2014 Edition."

Australasian Rescue Challenge 24-26 July 2015 • Alice Springs

The Australasian Rescue Challenge (ARC) ARC is an annual event which operates under the auspices of the Australasian Road Rescue Organisation (ARRO) and is hosted by an operational rescue agency within a particular State and/or Territory on a rotational basis.

The ARC has been operating formally since 1996 where all Australasian jurisdictions (including New Zealand) have hosted the event at least once with the Northern Territory being the exception.

The ARC brings together rescuers from SES, fire and rescue and mines rescue organisation. The annual challenge attracts teams from all states in Australia, several teams from New Zealand as well as a number of teams from Hong Kong and Singapore. From year to year the number of entries can be between 16 and 20 teams.

Each team consists of six members who include a team leader, a medic and tool operators. The teams are assessed on their ability to undertake a rescue (or rescues) from three scenarios spread across the three days that are time critical and patient focussed. They are assessed by a team of ARRO subject matter experts who are still operational within their own agencies and volunteer their time to this event. Teams are assessed on their Command, Medical and Technical abilities in the Time Critical, Entrapped and Controlled pits where each scenario reflects actual ‘on road’ incidents where in most cases live casualties, prepared using theatrical moulage are used to reflect realism.

Accompanying the three days of challenge events and preceding the first day is a full day learning workshop designed to enhance the knowledge of rescuers across the latest techniques, knowledge and application so that they in turn can return this knowledge to their agencies and thus increasing the response capability of rescuers at an Australasian level.

Holistically, the ARC is about learning from the event, learning from each other, competing, making new friendships, reacquainting with old friends and importantly visiting new locations. Many teams either arrive early or extend their time beyond the event and take the opportunity to combine a holiday with the event. Many teams are accompanied by their families and/or friends.

The 2015 ARC will operate out of the Greatorex Pavilion at the Alice Springs showgrounds where they will also be promoting a community fire safety day on the Saturday, inviting the public to attend to view the challenge and discuss first hand with NT Fire and Rescue Service, NT Emergency Service and Bushfires NT staff and volunteers, fire safety and related matters.

About The Australasian Road Rescue Organisation

ARRO is the peak body in Australasia for the development of knowledge and skills in road crash rescue. ARRO was established as the Australian National Road Accident Rescue Association (ANRARA) in 1996. ANRARA changed its’ name to ARRO in 2003 to better reflect its’ position in the World Rescue Organisation (WRO). ARRO represents Australasia at the WRO.

The vision of the WRO is to create a global rescue environment where any person involved in an entrapment or stranding incident anywhere in the world will be rescued and medically cared-for using best practices that are safe, effective and efficient, therefore maximising survival and recovery rates.

Through its involvement in road rescue challenges, and knowledge of the latest technologies, ARRO strives to improve the science and quality of rescue services provided to casualties and, therefore, a reduction in the severity of injuries. The ARRO executive has established a strategic plan to facilitate achieving these objectives.

ARRO is a membership based organisation and relies on the support of members and sponsors to exist as do the respective host agencies when running the event. Members can be individuals of emergency service organisations, as well as corporates with an interest in the rescue industry.

All members of ARRO volunteer their time and diverse industry experience to assist in achieving the organisation’s goals. This is represented in both the membership and their management team, which is made up of representatives from different jurisdictions, agencies and levels of management within those organisations.

ARRO’s current management team includes members from; ambulance, fire, State Emergency Service, and industry trainers. They come from Queensland, NSW, Northern Territory, Victoria and New Zealand. The NT Fire and Rescue Service’s Chief Fire Officer is the current President of ARRO.

ARRO’s Rescue Challenges have set worldwide standards over recent years due to our excellent relationships with GM Holden, Holmatro and, Kidde Australia s. The provision of contemporary model motor vehicles has made ARRO the envy of our WRO colleagues around the world.

Image courtesy of ARRO

For more information, go to www.arro.org.au

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Certification Education Day at Exova Testing Laboratories

It is not often that the fire protection industry has a day like the one at Exova Warringtonfire Aus Pty Ltd fire testing laboratories in May where five full scale fire tests were witnessed by 70 building officials and practitioners. The aim of the day was to show those with the responsibility to approve or design fire protection in buildings what testing takes place on the elements they are signing off on.

Peter Downer

Neil Bibby

Peter Downer is Director of Exova Warringtonfire for Australia and Asia.

Neil Bibby is the Editor of Asia Pacific Fire Magazine.

It also demonstrated the rigor behind the testing regime that ensures appropriate certification. The third objective was for the audience to see and feel what intense fire can be like in a controlled environment.

There were five tests on the day and three of them will be discussed:

- Full scale wall/Peno and fire door test.
- Bushfire test.
- Room Burn.

The 70 people witnessing the test knew the theory around the tests but many had not seen a test in their careers. Each of these tests had many take away points but in this short article only one will be mentioned for each of the three tests.

Keeping in mind that many of our readers are not professionals in this area each of the three tests will be described but not so detailed that it turns into a scientific paper, however enough to understand what went on.

Door test

The first test is a clear example of why we test at all by comparing a rated fire door with a solid core door, which many people see as an equivalent alternative.

Fire separation is measured in minutes, that is, the time it takes for the elements (a door in this case) to fail within the prescribed fire criteria. There are three ways in which an element can fail:

- Structural adequacy; this is the requirement to maintain a load bearing ability during a fire.
- Integrity; the ability of an element not to let flames and/or hot gasses transfer to the non-fire side, usually via cracks and the door edge.

Image courtesy of Exova Warringtonfire Aus Pty Ltd.

- Insulation; the ability to not transfer heat to the non-fire side of the element, 140°C average rise across the door and with no point increasing more than 180°C.

These three measurements are displayed in that order in minutes e.g. 120/60/60 as this test has no structural requirement the test was for --/30/30. In many guidelines it is said that that a solid core door is equal or close to that of a 30 minute rated door. The test on the day had the solid core door fail in only six minutes showing clearly that they don't have the protection many think they have.

Room test

The room test is to see how long an empty room will take to achieve flashover, the only fuel being the the walls and ceiling lining. There are four groups of materials which depend on the amount of time during a room burn test that material takes to flashover (FO).

The table above right is a simplistic explanation so you can get an understanding of what the audience was witnessing. For the room burn a lining of plywood was chosen, the test was quite dramatic with flashover occurring at 5.30 minutes; many were surprised at the intensity of the flashover in what is perceived as an empty room.

Bushfire test

The bushfire test assesses how the exterior of a building will react to the various aspects of a bushfire attack. This test is for individual elements such as windows, doors, walls, skylights etc.

Bushfire attack is classified by the amount of heat flux imposed on a building, during a bushfire, measured in kW/m^2 there are five BAL levels 12.5, 19, 29, 40 and flame zone. This test moved a heat source, equivalent to BAL 29, to simulate a bushfire attack on roof elements, in this case specifically a skylight The element tested behaved as expected during the test but what surprised many in the audience was the intensity of the heat when the radiant panel doors were opened forcing those at the front to retreat a considerable distance from the heat. It is worth mentioning that the BAL ratings are for building elements and that even at the lowest level of BAL 12.5 a person would perish within minutes if they were caught in the open during a bushfire of this intensity.

Group	examples of linings	Flashover (FO) time	Maximum Burner Heat
1	Masonry/ plaster type materials and the like	No FO in 20 min	300kW
2	Some fire-retardant treated timbers and some rigid core foams	FO 10-20 min	300kW
3	Most untreated timbers	FO 2-10 min	100kW
4	Most plastics	FO 0-2 min	100kW

Summary

Exova should be congratulated for this initiative, bringing together a large number of building surveyors, engineers and scientists to see what is involved in the testing of those parts of a building that are essential to stop the spread of fire and so allowing occupants to escape or in the case of bushfire, know what protection they needed in relation to the threat the surrounding bush has on the property.

All of those attending had their own takeaways from the experience and it will make them more aware of the consequences of their decisions and/or more confident that the testing regimes ensure that their decisions are the correct ones.

For further information, go to www.exova.com

Images courtesy of Exova Warringtonfire Aus Pty Ltd.

Confederation of Fire Protection Associations

International Fire Conference

Image courtesy of CFPA

Confederation of Fire Protection Associations (CFPA) was formed as the Conference of Fire Protection Associations in 1965. It was later renamed to its present the Confederation of Fire Protection Association International. CFPA-International has now grown to have two sub branches, CFPA-Europe and CFPA-Asia.

The formation of CFPA-Asia started in Minneapolis in 2002 when a number of the Asian members were attending the NFPA Conference & Expo and CFPA-International meeting.

The inaugural CFPA-Asia meeting had been held on the 23rd February 2003 in Hong Kong.

The mission of CFPA-Asia came from that inaugural meeting (to reduce the fire problem through education, research, codes and standards, improved communications, technology transfer, and the exchange of fire data and statistics). From that initial meeting CFPA-Asia has grown into a strong Asian group with 25 members representing 13 nations in the region the most recent CFPA-Asia meeting was held on the back of the International Fire Conference and Exhibition Malaysia held May 2015 in Malaysia.

The Malaysia Fire and Rescue Department along with the IFE Malaysia branch and the Malaysian Fire Protection Assoc. hosted an exceptional international conferences and exhibition in Kuala Lumpur. Speakers from Asia, Europe and the USA presented papers on topic interoperability, management, resilience, high-rise and many more topics.

The themes for the conference:

- Operational challenges for firefighters.
- New frontiers for fire safety engineering.
- Impact of sustainable built-environment on fire safety.

The exhibition showcased 146 different products from around the region and beyond. Innovation was the theme for the exhibition and we were not disappointed, new alarm systems, suppression techniques and rescue equipment were only some of the products on show.

The Confederation of Fire Protection Associations International and Asia held successfully meetings during the conference consolidating the tie in with fire protection and fire suppression.

We would like to thank the organising committee chaired by Director General Datuk Wira Hj. Wan Mohd bin Hj. Ibrahim for a great event.

I would also like to thank Steven Ooi Chairman CFPA-International for hosting Asia Pacific Fire Magazine during the conference.

For further information, go to www.cfpaa.com

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Product Compliance – the Confronting Reality

In November 2014 a fire raced up the side of a multi-storey apartment building in Melbourne's Docklands. The fire, which was started by a discarded cigarette, was fuelled by cladding material that failed to meet the necessary standards for combustibility.

Joseph Keller

Matthew Wright

Joseph Keller is Communications Manager, FPA Australia.

Matthew Wright is Chief Technical Officer and Deputy CEO, FPA Australia.

More than 400 people were evacuated during the fire, which destroyed seven units and caused an estimated $5m in damage. After a thorough and damning investigation by the Metropolitan Fire Brigade (MFB) and subsequent Post Incident Analysis Report, the Victorian Building Authority have launched an investigation into the builder and building surveyor. In addition, the Authority is also auditing all inner city high rise buildings to ensure compliance. Many owners within the Lacrosse building are now also pursuing a class action lawsuit. All because of the use of non-compliant, cheap cladding, likely in pursuit of commercial savings.

This incident could well be described as a near miss in terms of the potential life safety impact. Fire protection systems and equipment installed in this building performed beyond expectation in response to a fire risk they were not designed for or expected to mitigate. For example, the MFB's report confirms that the fire caused 26 sprinkler heads to activate and that fortunately in this instance a combined sprinkler/hydrant water supply supported this activation to maintain a level of effectiveness to allow evacuation. Separate sprinkler and hydrant water supply arrangements that were also permissible may have resulted in a dramatically different outcome. Fire protection systems and equipment installed within buildings are not expected to contend with fire spreading over multiple floors via the external façade and this event clearly indicates that the strength of building safety performance is the sum of many parts. The failure of one part alone can have significant consequences. Hence the importance of product compliance and independent confirmation that products achieve

▼ Preparing for live fire testing of a skylight

Image courtesy of Fire Protection Association Australia expected performance benchmarks and are ‘fit for purpose’. This incident is just one small sample of what FPA Australia believes is a systemic issue across the building and construction sector in Australia. The Association supports the work of the regulator in investigating this incident, but believes the weight of evidence of non-compliance issues now requires strong action to reform at a national level regarding product compliance requirements and that this should be risk based before a fire tragedy occurs involving loss of life.

Product compliance – the case for a thorough review

The Association has long advocated for change in this space.

As an example, in 2011 the Victorian Auditor General’s Office (VAGO) report into the private building surveying industry in Victoria found that 96% of permits examined did not comply with the relevant building and safety standards.

At the time the Association called for a similar full-scale review of the signoff process into building occupancy. FPA Australia CEO, Scott Williams, said that despite the efforts of FPA Australia and many other industry stakeholders, more than three years later little had changed.

“Today we still have occupied buildings in Australia that have significant questions over the level of life safety provided for occupants and the public,” Mr Williams said.

“In the building and construction industry it is widely known that non-compliant products are bypassing the building approval process and are being installed in Australian buildings. This is a most significant concern to life safety and yet worryingly, in almost all cases these issues are only identified when a fire event occurs.

“The community has an expectation that, particularly in new, multi-storey buildings, they will be reasonably safe from fire. It appears this is not the case in many Australian buildings today. We know anecdotally that there are many other non-compliant products installed in many other buildings around the country.

“In a developed country, non-compliant products simply should not be installed in buildings without required approvals. All stakeholders, not just the Building Surveyors, need to take their share of responsibility for product specification, selection and use in the design, installation and approval process. Clearer expectations and education of roles and responsibilities and good practice advice is needed.”

It is well recognised by Australian industry that global economic forces have an increasing impact on the production and supply of goods and services.

The World Trade Organisation (WTO) Agreement on Technical Barriers to Trade signed by Australia (agreement member) to support acceptance of imported and exported product has the following objective:

“The Agreement on Technical Barriers to Trade tries to ensure that regulations, standards, testing and certification procedures do not create unnecessary obstacles, while also providing members with the right to implement measures to

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achieve legitimate policy objectives, such as the protection of human health and safety, or the environment."

Australia's acceptance of this WTO Agreement has influenced the development of the Evidence of Suitability options for product compliance in the National Construction Code (NCC). In particular, Australia's acceptance of this WTO Agreement has provided flexibility to adopt a range of forms of evidence, including certain international documentation.

The Australian regulatory requirement has adopted this flexibility providing multiple pathways to demonstrating product compliance. However each of the pathways currently permitted, have varying degrees of rigour when it comes to product assessment. For example it is equally acceptable under the NCC to demonstrate evidence of product suitability via a scientific test report from an accredited laboratory, as it is to accept the opinion of an individual with unknown qualifications.

The safety and confidence of consumers and the interests of product manufacturers and suppliers who take product compliance seriously is not supported by the current regime. Many FPA Australia members expend significant time and finances to research and test products to appropriate standards and also engage in product surveillance regimes. To lose market share to competitor product that has not undergone similar assessment does not provide much incentive for these companies beyond maintaining internal quality assurance standards. The result, less investment in product compliance assessment. Furthermore it is difficult for designers, installers, project certifiers and enforcement agencies to determine compliance due to the absence of rigour of some options and indeed the multiple options available.

Earlier in 2015 another high profile product compliance issue was revealed with the well documented use of Infinity Cable, a non-compliant electrical cable imported and installed in tens of thousands of Australian homes. Also with the demise of Australian manufacturing, the demand for imported product is not likely to diminish in the foreseeable future. Combined with a growing list of anecdotal instances of product non-compliance, pressure is mounting on governments to continue Australia's commitment to the WTO Agreement on Technical Barriers to Trade to support economic prosperity and productivity objectives, but take decisive and meaningful action, as permitted by this Agreement to better establish and maintain minimum product performance standards and protect Australian business, industries and the community from the consequences of under-performing and un-safe product.

Solving non-compliance – Association initiatives

The investigation of building practitioners involved in the installation and certification of non-compliant products only treats the symptoms of this major issue, not the cause and does not necessarily rectify the problem for building owners and occupants.

Reactive measures aimed at resolving non-compliance issues when they are discovered are important. However, the Association believes these cannot be the only measures applied to support the rules for compliance outlined in the National Construction Code, otherwise unscrupulous building practitioners will have little incentive to comply if cheaper options are available.

FPA Australia has determined three elements that need to be attended to in order to treat the product compliance issue.

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1. Lack Of National Risk Based Product Compliance Framework

There is a wide range of options for demonstrating compliance with rules in relation to products in the NCC Building Code of Australia, and they do not all provide the same level of rigour. Although the purpose of these options is to allow maximum flexibility in the product supply chain, one unintended consequence has been exploitation caused by unclear parameters.

FPA Australia Initiative

The Association is now calling for an urgent review and reform of the national product compliance framework and is developing a new risk-based conceptual approach that categorises product into three categories; low, medium and high, and prescribes the rigour of assessment required for each category commensurate with the risk of product failure and the impact this could have. In a further innovative step, FPA Australia's concept is to allow industry to partner with government to develop assessment rigour requirements for product types within these categories and have a level of ownership of the requirements, providing leadership to their individual industry sectors. Figure 1 below provides a snapshot of this conceptual framework.

The Fire Australia 2015 Conference hosted by FPA Australia in March focused on product compliance issues and the resolutions from the Conference were as follows.

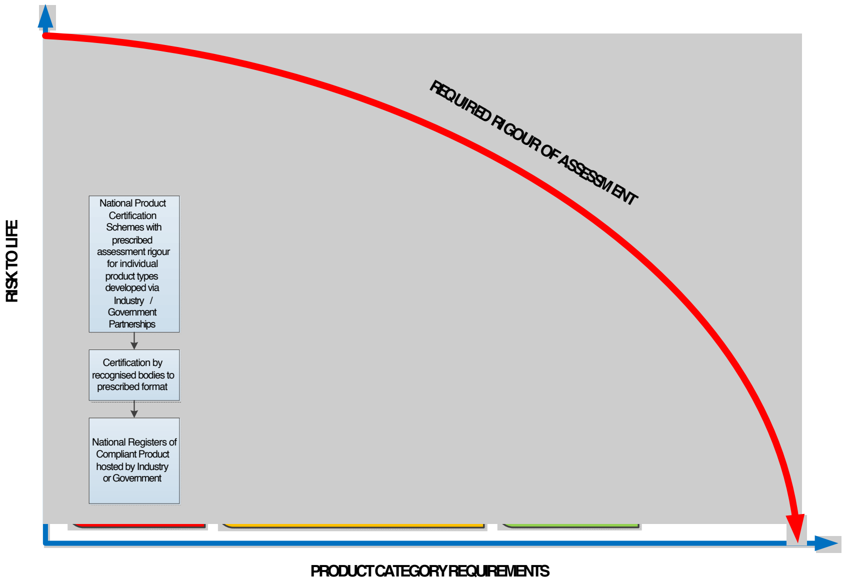
1 FPA Australia supports the establishment of a clear and meaningful product compliance framework that is aligned to the risks. Without such a framework, the safety and performance objectives of Australian construction regulations and standards are unlikely to be delivered and the community is at risk.
2 FPA Australia has resolved to constitute a Fire Products Reference Group for the purpose of establishing best practice technical schedules for the assessment and certification of fire protection products for the Australian market.
3 FPA Australia will in future establish a product listing scheme (FPAL) that provides a single point of reference to validate fit for purpose products.

The conceptual framework developed by FPA Australia (Figure 1) would pave the way for these resolutions to be progressed and outcomes achieved. Major international and local fire product appraisal bodies have already agreed to participate in the FPA Australia Fire Products Reference Group.

The appropriate regulatory setting for this review is the Australian Building Ministers Forum. This group, as part of Council of Australian Governments (COAG), sets the national agenda for building and construction in Australia. The risks of product non-compliance are not limited to any state or territory and the Association believes this issue must be addressed at the national level.

Former Parliamentary Secretary for the Federal Minister for Industry the Hon. Bob Baldwin initiated a working group to tackle product compliance issues early in 2015. Mr. Baldwin has since been replaced in this position by the Hon. Karen Andrews and FPA Australia and other industry stakeholders are continuing to champion for change to requirements nationally through the Federal ministry and the Building Ministers Forum.

Figure 1 – Conceptual National Product Compliance Framework


REQUIRED RIGOUR OF ASSESSMENT
RISK TO LIFE
National Product Certification Schemes with prescribed assessment rigour for individual product types developed via Industry / Government Partnerships
Certification by recognised bodies to prescribed format
National Registers of Compliant Product hosted by Industry or Government
PRODUCT CATEGORY REQUIREMENTS

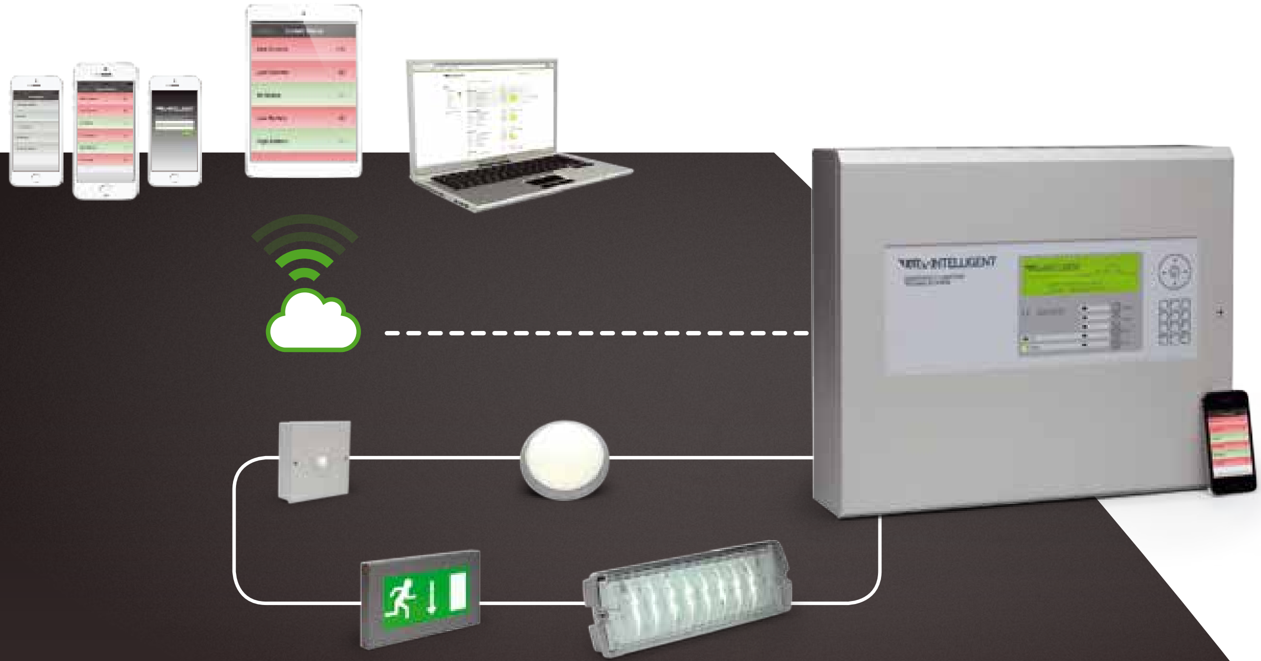
2. Lack Of Industry Understanding And Education

FPA Australia believes there is a widespread lack of understanding of the rules regarding product compliance across the spectrum of individuals working in building and construction. Such people include, manufacturers and suppliers, labourers on building projects, designers, installers, certifiers, building surveyors, purchasing officers and even councils and state and federal regulatory authorities.

FPA Australa Initiative

FPA Australia has already been a leading voice in providing educational material regarding product compliance requirements. The FPA Australia Position Statement PS-05 Product Compliance and Evidence of Suitability was published in July 2014 and outlines the Associations position in addition to explaining the current product compliance pathways. This document is freely available on the Associations website www.fpaa.com.au and was referenced and supported multiple times in the recommendations of the MFB Post Incident Analysis Report regarding the Lacrosse building fire incident as a document that building practitioners are encouraged to read and understand.

In the future FPA Australia intends to run a range of CPD events to advise all stakeholders in the building and construction industry of the specific requirements under the NCC as well as a detailed understanding of the different options for demonstrating product compliance regarding fire protection



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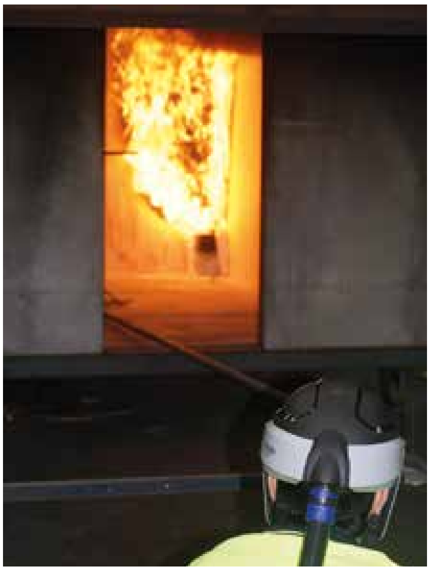

Images courtesy of Fire Protection Association Australia

▲ Live fire testing clearly shows the difference between fire resistant and flammable building products

◀ A supervisor keeps note of progress during a full room burn test.

products. Our magazine partner AFAC is also contributing to this important initiative by running its own a briefing sessions on the lacrosse apartment fire.

3. Lack Of Adequate Regulatory Enforcement

Legislation is only as good as its enforcement. For fire safety, the Association believes the stakes are too high for enforcement to be ignored. FPA Australia considers that it is a core responsibility of government regulators to undertake targeted enforcement aimed at deterring and treating poor practice especially regarding product compliance. The privatisation of the building approval process throughout Australia increases the responsibility on governments to remain vigilant and ensure the regulations they have introduced are actually being applied.

Mr Williams said until the issue of non-conforming products was taken seriously by regulators, the industry and the community, it would not be resolved.

"Inferior and potentially dangerous products have been, and continue to be, sold in Australia for building and construction purposes and these products routinely end up being installed in all types of construction, from family homes right up to major public and commercial buildings," said Mr Williams.

"In instances where such products may dramatically increase the risk of fire, it is easy to see the potentially deadly consequences of such non-compliance. This is why there are established minimum standards in Australia, but there is a current lack of scrutiny and general complacency at point of sale and installation, which means product may not always meet these expectations.

"The hard truth is that, in the rush to reduce technical barriers to trade and generate import and export opportunities, government has established multiple options for product compliance with varying assessment rigour.

"Some of these options are open to deceptive practices and there are systemic problems with the way some products are tested, certified and approved for sale. This is an issue that must be addressed before lives are lost.

FPA Australia Initiative

The Association will continue to make strong representations to governments at all levels that change is needed in the auditing and enforcement of building product compliance in Australia. Through our membership on the Australian Building Codes Board's Building Codes Committee (BCC), and our direct contact with the state, territory and national regulators and the media, we will continue to vocalise the need for change until this is realised.

Conclusion

A sobering final thought to illustrate how much of a problem this issue could become for Australia: weather-proofing in New Zealand and Canada and the problem of 'leaky buildings' has created significant economic hardship for building owners. The estimates for New Zealand (roughly the size of Victoria) are that the repair costs were up to $11.3 billion in 2009 and a recent New Zealand High Court decision awarded $25m to the owners of one building to compensate for poor construction practice. The risks of non-compliance are damaging, costly and in the case of fire risks, potentially deadly.

FPA Australia's undertakings outlined above will go some way to addressing the critically important issue of fire protection product compliance in Australia. However, until all stakeholders pursue this issue with similar focus, we cannot expect the problem to be resolved. The specification, purchase, installation and certification of non-compliant products is not the fault of any individual stakeholder—it is up to everyone in the building and construction supply chain, as well as regulators, to shoulder this responsibility. The community expects nothing less.

For further information, go to www.fpaa.com.au

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The Importance of Listing Sprinkler Equipment

The hanging and bracing of a sprinkler system is a key consideration in every sprinkler design and installation. Assuring that the hanging and bracing products used to install sprinkler systems are effective is imperative for proper performance and stability of the system. One method for achieving such assurance is through the third party UL Listing of the hanging and bracing products.

Jeff Hebenstreit

Jeff Hebenstreit is a Principal Engineer at UL specializing in fire suppression products.

Chapter 9 of NFPA 13 – Standard for the Installation of Sprinkler Systems states that "…the components of hanger assemblies that directly attach to the pipe or to the building structure shall be listed." There are some exceptions, as permitted by other sections of NFPA 13. To demonstrate compliance with this section, UL offers a Listing service that lets end users and Code Officials know that the manufacturer has submitted a product through the evaluation process with successful results and is manufacturing the product in accordance with the UL Certification Program requirements.

An example of this is a product Listed to Standard ANSI/UL 203 – Pipe Hanger Equipment for Fire Protection Service. The scope of UL 203 covers the performance of pipe hanger equipment for use in supporting pipe employed in sprinkler systems, water-spray systems, and other piping systems used in fire protection. This includes products, such as various hanger types (band, clevis, ring, etc.), brackets, flange clamps and C clamps, ceiling flanges, clips, concrete inserts, couplings, expansion anchors, powder driven fasteners, and retaining straps. The load evaluation requirements for such pipe hanger equipment within UL 203 are consistent with the NFPA 13 requirements. Similarly UL 203A – Sway Brace Devices for Sprinkler System Piping contains requirements for sway brace devices.

UL 203 Testing

Products submitted for evaluation are installed and evaluated in a manner to simulate field installations. For example, hangers are installed in a test assembly with the test load applied to a pipe in the hanger, and anchors are installed in concrete blocks for testing. For hangers and other equipment used to support pipe covered by UL 203, testing may consist of the following depending on the product type:

- Metallic Coating Thickness Test – applicable for coatings where corrosion resistance is required based on product design
- Pull Test – applicable to load bearing hanging equipment to evaluate the product strength to withstand the test loads, without rupture, pull out or release of load.
- Equipment for metallic pipe – tested with load equivalent to 5X the weight of 15 ft span of schedule 40 steel water filled pipe plus 250 lbs, or minimum load of 750 lbs for 2" and smaller pipe.
- Equipment for thermoplastic pipe – tested with load equivalent to 5X the weight of 15 ft span of thermoplastic water filled pipe plus 250 lbs, or minimum load of 340 lbs for 2" and smaller pipe.
- Threaded parts are installed and tightened to specific torques for testing.
- Concrete inserts, expansion shells/anchors, and fasteners are installed into concrete blocks for testing.
- Vibration Test – applicable to expansion anchors, powder driven fasteners, welded studs, C-clamps without locking nut or retaining strap, and other hangers subject to performance under vibration. This test consists of 100 hrs vibration with a test load applied.

- Upward Thrust Test – applicable to products intended to restrain the vertical movement of pipe and shall withstand 340 lbs without displacement of more than 1/8 inch.

UL Listing Process

There are multiple elements of UL's Listing process for a product. For example, the steps in the table below are part of an evaluation for a new manufacturer of hanging equipment:

UL Listing Process Information	
Product Information Submittal and Development of Evaluation Plan	To get started, a manufacturer provides information to UL on the product being submitted for evaluation. UL reviews this information to develop an evaluation plan, which may vary dependent on the product features. The plan will generally consist of a construction review and performance testing.
Construction Review and Product Testing	Once the evaluation plan is finalized, representative samples of the product are sent to UL for the evaluation. Upon receipt of the representative samples, a construction review is conducted to evaluate any dimensional and product design requirements. The samples are then subject to the testing required by the standard for evaluation. A review of the required marking and installation instructions is also conducted at this point.
Compliant Product Certification Report	The results for products that are found compliant with the requirements of the standard are provided to the manufacturer in a certification report. Once a product is listed, manufactures are required to continue manufacturing the product in accordance with the specifications of the product that was submitted for evaluation. These specifications are documented and reviewed during the UL surveillance audits.
Non-Compliant Product	A letter report is issued to manufacturers where products are found to be non-compliant and no Listing is granted. Products may be redesigned to address the inadequacies for reevaluation. Ultimately this process assures that only those products meeting the requirements of the standards are listed, thus enabling only compliant products to bear the UL Mark.
Factory Inspection and UL Listing Mark	Prior to manufacturing product that is eligible to be UL Listed, the UL Field Representative will audit the new manufacturer facility to verify the product is being produced in accordance with the UL requirements and the manufacturer is clear on the application of the UL Listing Mark.
Application of the UL Listing Mark	Product that is manufactured in accordance with the UL requirements is eligible to be marked as UL Listed.
UL Surveillance Program	A very important aspect of a product listing is the continued surveillance of products. Manufacturers of listed products are enrolled into UL's Follow-Up Service program. This program consist of product inspection through periodic audits at the manufacturing site by UL's trained Field Representatives and testing of listed products to verify its continued compliance with the product requirements. The visits by UL Field Representatives are generally unannounced and during these inspections, samples are also selected and sent to UL. These samples undergo further examination and testing as part of the ongoing surveillance.

Summary

Proper system support is a critical aspect of an installation to achieve the desired level of protection expected of a sprinkler system. Manufacturers find value in having a UL Listing for a product, knowing that an independent third party has evaluated representative samples of the product against the requirements of the standard. Authorities having jurisdiction, end users, and product installers look for the UL Listing Mark as an indication that the product has been manufactured in accordance with the UL requirements. The evaluation process identifies those products that do not meet the standard requirements. The UL Surveillance Program is a key component of the Listing as it provides a counter-check that products are continuing to be manufactured in accordance the specifications of the originally evaluated product. These aspects combined make UL Listing of a product an important element in the design and installation of effective fire sprinkler systems.

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Mine Rescue Competition, Testing Rescue Crews

From humble beginnings 20 years ago, the Victorian Mine Rescue Competition has emerged as a well-respected, highly competitive national event. With teams entering from across the nation, the Victorian Mine Rescue Competition (VMRC) has become a truly national event.

Neil Bibby

Teams come from mines that extract the multitude of commodities that Australia is famous for, testing their skills against teams operating in many different environments. The sharing of knowledge and experience enables mine rescue personnel to be called upon to serve not only in their own operations but operations throughout the state and across the country. Having a significant pool of highly trained rescue personnel across Australia contributes greatly to the minerals industry's commitment to zero harm.

Victoria, a small State geographically, has much to be proud of. Victoria has large open cut coal mines that provide almost all of Victoria's power generation needs, gold fields that have been operating on and off for over 150 years and significantly contributed to prosperity of the State, as well as re-emerging base metals mines in the eastern part of the State. With such a long and proud mining history, the commitment to safety and health in the minerals industry is paramount. Mine rescue capability provides the assurance that on the rare occasion that an incident occurs on a mining site, we have the best people in place to respond. Mine rescue personnel are without doubt the most dedicated individuals you could have the pleasure of knowing. The absolute commitment of these people in times of significant duress is admirable indeed.

What started out 20 years ago as a demonstration of mine rescue techniques became the Victorian Mine Rescue Competition, when Orica Australia and Drager Australia, put forward trophies for the event and three teams were invited to participate: Stawell Gold Mines and Benambra Mine from Victoria, and Woodlawn Mine from N.S.W. Due to an

Image courtesy of VMRC

Neil Bibby is the Editor of Asia Pacific Fire Magazine.

incident at the Benambra Mine the week prior, the Benambra team was unable to compete. From that initial competition at Wonthaggi, the VMRC has become one of Australia's leading competitive events with teams coming from across the nation each year to test their mine rescue skills.

The Victorian Mine Rescue Competition is run as a mine rescue and emergency response capacity building exercise. The competition, which has been running since 1993, sees mine rescue and emergency response teams from mine sites around Australia compete against each other in a variety of simulated emergency situations to put their skills to the test, and share their extensive knowledge with each other.

The competition is undertaken with realistic simulations using volunteers acting as patients made up to show various injuries and placed in simulated accident scenarios. The equipment used by teams is as they would have in a real life situation.

The main competition events are divided into a number of different categories which include:

- First Aid.
- Fire fighting.
- Rope rescue.
- Search and rescue.
- Breathing Apparatus.
- Combined Team event (Spencer Herd Challenge).

Fire Fighting has become one of the more spectacular parts of the event. Fire is one of the major concerns for mine workers and management, with a real threat to life and mining infrastructure. The remoteness of many mines results in the need for self-sufficiency, as government agencies may be hours away, if available at all. The disruption to a mine through fire could also be significant with repair and/or replacements of equipment taking months. Firefighters depend on their own skills to contain fires along with the built in detection and suppression equipment specifically designed for mining. Recent fires in an open cut coal mine in southeast Australia saw significant loss of equipment and disruption to the community.

Teams are scored on their practical skills as well as their theoretical knowledge with a combination of time taken and the safe manner in which the team acted towards both the victim and team members. The Spencer Herd Challenge looks at leadership and team safety along with the manner in which the task was completed.

Summary

With teams entering from across the nation, the VMRC has become a truly national event. The sharing of knowledge and experience enables mine rescue personnel to be called upon not only in their own operations but operations throughout the state and across the country. Having a significant pool of highly trained rescue personnel across Australia contributes greatly to the minerals industry's commitment to zero harm.

The 2015 Victorian Mine Rescue Competition will be held at Energy Australia's Yallourn mine in the Latrobe Valley 16th – 18th October.

For further information, go to www.minerals.org.au/divisions/victoria/vmrc

Images courtesy of VMRC

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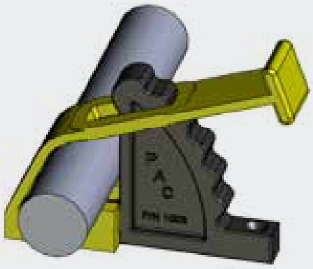
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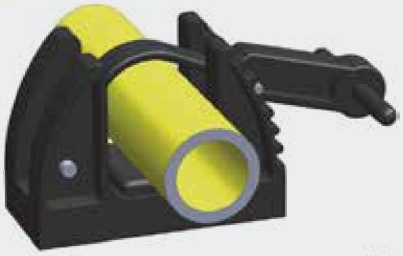
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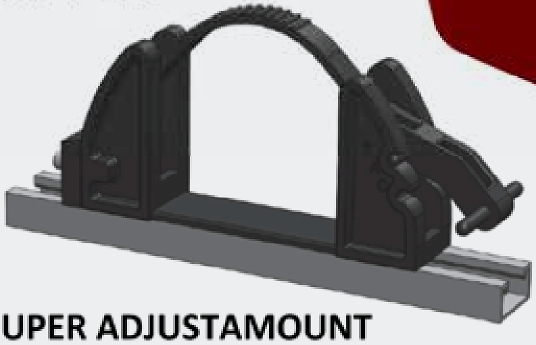
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PPE/PPC – the Last Line of Defence

One of the most important safety tools that a firefighter brings to an emergency incident is their senses. In their raw state, the well trained and heightened senses of; sight, smell, feel, hearing and taste, provide the human body with a marvellous interconnected protective mechanism, which allows us to be both pre-warned of hazards and potential risks, as well as the ability to retreat from dangerous situations.

Mark L. Gribble

Mark L. Gibble is a member of the International Standards Organisation (ISO) and Standards Australia representative for firefighting PPE.

However to allow firefighters to actually do their task or complete their mission safely, they need to have a choice of all the PPE protective benefits that today's technology can offer. It is important to achieve a safe balance between all 3 elements of protection, comfort and awareness.

There had been much discussion and debate about the level of protection offered by PPC/PPE while maximising comfort or Metabolic Heat Release. Can we achieve the balance between protection and metabolic heat release? Todays technology certainly provides the balance for good moisture management therefore metabolic heat release while maintaining thermal protection. What does your Structural Firefighting Ensemble protect you against and why and how is the subject of an upcoming article and is an exciting step into the marriage of science, technology and practical Firefighting.

For some countries including the alpine regions of Australia during winter, this also includes hypothermic stability for the body.

Quite some time ago, there was a limited debate about Firefighting PPC and exposing some parts of the human anatomy so as to directly feel when it was getting hot. Unfortunately far too often this escalation in heat exposure is sudden and severe. Quite some time ago when fire hoods were introduced, some of the traditional thought was that there was benefit in exposing ones ears to better feel the heat of the fire as you advanced towards it. During that period many of the burn injuries were at the interface areas of the PPC, where different elements of the PPC met (or worse -didn't meet), often around the wrist, neck and ears. I recall advising those who used to advocate exposing the ears to heat and even flame, that the ears were not designed to be "one off thermal detectors" and that you may need them during retirement.

Fortunately the wider use of thermal imaging cameras (TIC's) and Intelligent

Image courtesy of Mark L. Gribble

Clothing technology like the integrated Thermal Sensor Technology (TST) built directly into the fabric and improved understanding of the science of fire behaviour and more comprehensive live fire training, has greatly improved the firefighters situational awareness. This technology and training also allows the firefighter to gain a better understanding of their own physiology and how it performs in relation to their particular PPC in various firefighting environments. However, until more recent times, this very important 3rd element of awareness has been given less consideration in the overall balanced equation of PPC design and selection.

Note: (The broader subject of Emergency Incident Situational Awareness encompasses many issues of the incident such as good intelligence gathering, clear/concise and dynamic Incident Action Plan (IAP) which is well communicated, a safe span of control and a the application of a "Risk verses Gain" philosophy to name just a few, and is a paper all on its own).

The requirements of protection for firefighters often has some impact on one or more of the body's senses. Sometimes the PPE has a positive or improved affect on the performance of your senses. One good example of this is the ability to monitor the "heads up display" in a B/A mask or simply see in the dark with a torch or in smoke with a TIC and all "hands free" if you choose.

However, PPE can often reduce or limit some of the functionality of the senses. Foam or water on the helmet visor or B/A mask may limit ones vision. Using powered cutting equipment in conjunction with ear/hearing protection will reduce a firefighters ability to hear.

Fortunately there are often alternate work practices which successfully cater for many of these scenarios. Knowing these "work arounds" or alternate work methods, and being well trained in them, often comes with good practical training, time and experience in the job and contributes to a better and safer use of our PPE/PPC.

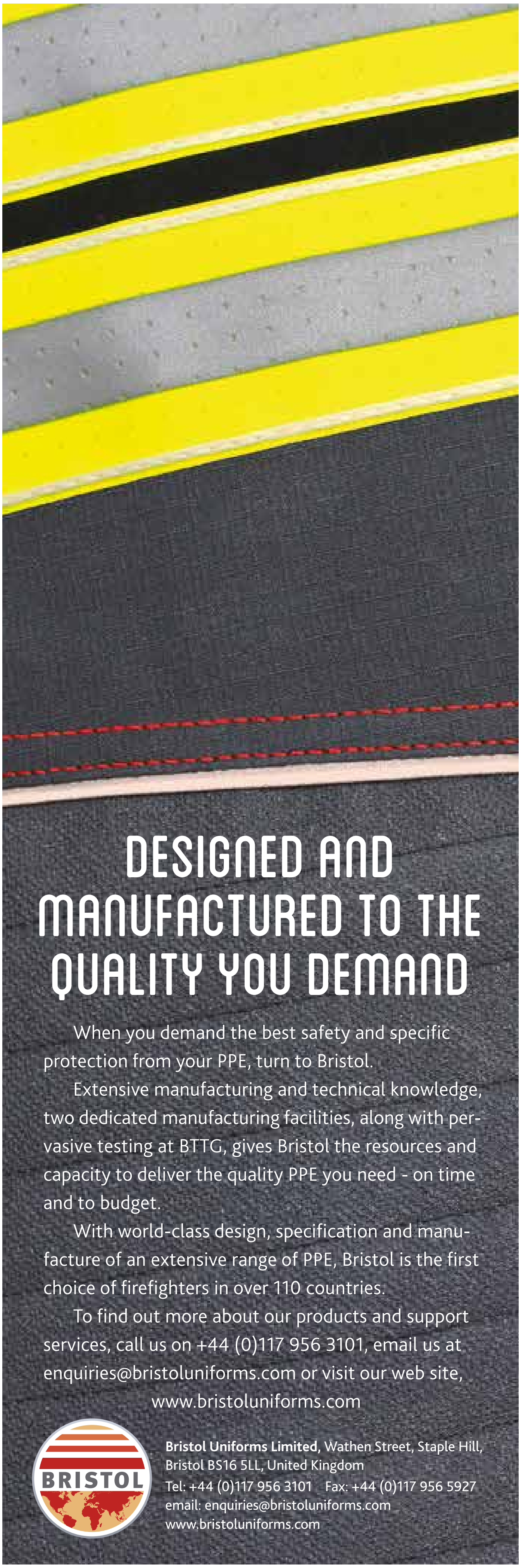
Additionally thick traditional structural firefighting gloves may decrease dexterity and feel. It is for this reason that I have researched and sought a number of improved glove dexterity test methods and regimes for inclusion into the Australian and ISO Standards.

In conjunction with this a number of advancements have been made in the area of thinner moisture barriers, better sized moisture barrier size templates as well as a more comprehensive choice of lighter more flexible outer shell materials for firefighting gloves.

However some of the problem with the issue of dexterity when working with a gloved hand is in the design of the ancillary equipment which it has to interact with. Radios that were not waterproof and had small non-positive buttons, poor visual read-outs certainly contributed to the problem. However with positive consultation with many of the manufacturers of communication equipment, there has been significant gains over the past ten years to respond to our industry's requirements of hot, wet and often robust needs with appropriate dexterity and feel.

In conjunction with this, those standard makers and purchasers who have a thorough working knowledge and understanding of the potential exposures which firefighters regularly encounter and how that is inherently linked to the performance criteria of our PPC/PPE, will be better placed to enhance the continuing balance between Protection, Comfort and Awareness.

For further information, email markgribble7@bigpond.com



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Voice Communications, without Limitations

Historically accepted limitations of where a firefighter can and cannot communicate are being challenged through innovation and next-generation technologies.

Ben Pearce

Ben Pearce is Director of Sales for Codan Radio Communications.

The world of two-way radio voice communications has a long and robust history of providing reliable communications in the most difficult environments. Despite an ever changing communications world, with cellular voice and high-speed data available at ever decreasing costs and continually expanding coverage, the public safety community continues to rely almost entirely on two-way radio voice communications. Arguments against the change to newer technologies such as 3G/4G cellular include overloading of public networks during major emergencies, lack of robust equipment designed for the harsh public safety environment and security of information (privacy) when using public networks. While these concerns have long been valid, and continue to be the case in some instances today, a growing number of companies and customers are learning to manage these perceived weaknesses while still using the tremendous strengths these other technologies provide.

A History

Two-Way radio communications has provided communications for firefighters for the past 50 years. While the technology has vastly improved over this time, the innovation surrounding the basic operation has not changed much since the advent of trunking technology. Initial radio communications on the fire ground was for communications between the incident and the station, not between individual firefighters. Over time this evolved to allow each firefighter to carry a radio into the fire, an advancement that has saved countless lives. More and more channels were added to these initially simple systems which resulted in the last great innovation of two-way radio communications; trunked radio. Trunked radio finally allowed users in the field make use of a large number of radio channels in the most efficient ways possible while still allowing a simple user experience.

As these technologies grew, from basic conventional VHF communications to larger, more capable trunking

Image courtesy of Codan Radio Communications networks, the reliance on these networks, as well as the costs, grew substantially. Advancements in digital radio communications further added to this, allowing for more channels using the same amount of frequency spectrum. Digital radio brought with it a suite of additional features and clearer voice communications, however the onset of these various technologies that would not interoperate with each other created its own set of issues.

Two-Way Voice Today

Today's two-way radio networks have advanced FAR beyond where they first started. Digital technologies such as P25, DMR and Tetra have been adopted by public safety agencies all over the world. Analog FM radio is the technology that still makes up the majority of the radio networks around the world but that is changing though as costs for digital two-way technology slowly drops. With the adoption of digital radio communications comes the entry into the world of data and IP networks. Users of these new digital networks continue to push for more information which further pushes the technology to the limit.

With increased capability, come increased costs. The price to deploy a wide-area digital radio system, dedicated for the use of one or more public safety agencies, is high. As agencies move to these technologies, with the hopes of enjoying the latest features of a digital radio system, trade-offs must be made. More often than not, the trade-off is system coverage.

Designing a new radio network to communicate with these devices is an expensive endeavor. Public safety agencies do not have the benefit of putting up radio towers everywhere (like they do in the cellular world) as the price for these sites is very high. Therefore, proper planning must be done to ensure that the most radio coverage can be provided in the most cost-effective way. Often, the result is a radio system designed to communicate with high power radios found on a vehicle while outdoors, and not the portable radios on a person. In the end, this results in a "successful" radio system design that lacks the coverage required by a large majority of its users when indoors. If only all major incidents occurred outside where the radios worked well, but perhaps, there is a way to get the best of both worlds.

📷 Image courtesy of Codan Radio Communications

Complementary Technologies

As the world of two-way radio has slowly been moving to the digital era, the world of IP networks has quickly arrived and been absorbed. Any radio technician that has worked on a digital radio system today will tell you that a background in IP and networks is almost mandatory. While this is not a surprise to anyone in the radio industry, it is interesting to see how the old habits of radio system design continue to remain. Relying on pure radio technologies with slow adoption of newer technologies due to old reasons is a common problem that holds back the ability for Public Safety agencies to use their radio systems where they want, when they want, without limitation.

In discussions with the head of any public safety agency today, their issues will be immediately obvious. When asked what the users of their system do when they cannot talk on their radio, the answer usually comes in two forms: "move to a location where the radio works" or "use your cellular phone". Unfortunately public safety operations are not that easy to move to a location that works, which leaves the use of a cellular phone as an ongoing and common solution to a VERY common scenario.

Historically there have been some simple technologies that agencies could use to solve these problems. This has included transportable repeaters, vehicular repeaters and Bi-Directional amplifiers; each with their own pros and cons. Bi-directional amplifiers are permanently installed into buildings, requiring significant design and installation costs. Vehicular repeaters provide the benefit of extending a trunking system's coverage to a nearby portable radio, but they are limited to the street and require connectivity to the existing trunking system. Transportable repeaters offer unlimited flexibility in where they are located, but provide only communications

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to the users on scene and not back to a central command or dispatch.

If the common approach is to use cellular phones to communicate when radio communications do not work, perhaps the combination of new and existing technologies can remove some of the trade-offs currently accepted in the two-way radio systems. As mentioned before, the world of IP networks is already fully embraced by the two-way radio industry. Cellular data systems, IP data networks and digital radio systems all have the potential to form a very powerful solution.

A hybrid approach

Transportable repeaters offer a simple solution with a set of limitations preventing their wide scale use in the industry. The most common limitation for a transportable repeater is its lack of connectivity back to a central headquarters or dispatch; or even to additional transportable repeaters in a wide-area deployment. Other limitations may include large repeater size, complexity to deploy (requiring a radio technician) and the passing of digital radio signals and encryption to allow digital radio features to be properly utilized (a common issue with repeaters made up of two mobile radios). Overall, the main issue that continues to prevent transportable repeaters to be used as a regular solution remains lack of connectivity outside of the fire ground or area of operations.

With the advent of digital radio protocols such as P25 and DMR, the ability to connect these radio systems over an IP network has become very simple. Open standard protocols such as the P25 Digital Fixed Station Interface (DFSI) and the DMR equivalent allow the very low data rate of a digital radio signal to be passed from a repeater to a central server for distribution to a headquarters or dispatch facility. Instead of legacy technologies that simply passed analog voice, users on this system are now passing their digitally encrypted voice AND radio data such as Unit IDs and

Emergency messages over a network.

Agencies currently using these digital technologies have already embraced cellular 3G/4G networks as a solution of last resort. If this is already the case, then perhaps the use of these well-established cellular networks should be further considered. 3G/4G networks are currently being deployed around the world at a rate never seen before. The coverage and reliability of these networks continues to improve while the limitations do still remain, although to much less degree. The addition of a 3G/4G backhaul for a transportable repeater would now allow for the digital radio interface to connect to any device, on any network. The combination of these technologies could allow users to use their existing, trusted digital radios in locations they have never dreamed of.

Two-Way Radio of the future

The capabilities and limitations of the two-way radio systems currently in use in the Public Safety industry have not changed significantly for a very long time. New radio system designs continue to accept limitations that are historical and based on legacy. As more and more technologies become available, it is imperative that they be considered; not for complete change, but to compliment the very robust systems that are already in use. The world continues to demand more and more capability in their communications which continues to drive innovation. Technologies such as HF Radio, Satellite, microwave, LTE, MIMO and others are amazing feats of engineering that could further enhance the radio systems that are relied upon every day to save lives. Let’s continue to ask how we can improve the ability to communicate in the Public Safety world, wherever, whenever.

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Bring your Lipstick to Adelaide

AFAC15
NEW DIRECTIONS IN EMERGENCY MANAGEMENT
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Have you ever been part of an Incident Management Team where women outnumbered men? How many female incident controllers are in your emergency service organisation? Have you seen a fire crew that was majority female? Were any of them wearing lipstick? What would you think of them if they were?

Ariana Henderson, Manager Fire and Emergency Recovery, along with Sandra Robinson, Project Coordinator Fire and Emergencyfrom Parks Victoria, will answer these questions of diversity at this year's AFAC and Bushfire & Natural Hazards CRC conference.

The largest and most important emergency services and public safety event in Australasia, the conference will take place at the Adelaide Convention Centre from 1-4 September 2015.

This year's theme is *New Directions in Emergency Management*, and Ms Henderson is just one of over 100 speakers on the program. Her presentation, Bring your lipstick, with colleague Sandra Robinson, will have a particular focus on the industry's struggles with diversity.

“You don't have to look hard within the emergency services industry to see a disparity in the representation of men and women, particularly in leadership roles,” said Ms Henderson.

The inclusion of women into urban fire services has been slow, and they continue to be under-represented. Participation rates for female firefighters across Australian fire services range from 1.5 percent to 4 percent. So what are the blockers to women becoming leaders in emergency management?

AFAC/Bushfire and Natural Hazards CRC Annual Meeting
Wellington, New Zealand, September 2, 2014
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“Some barriers experienced include working conditions and family commitments; a perceived lack of physical and mental ability to do the job, and an ingrained culture and subconscious bias.

“We are hardwired to adjust our behaviours to fit into communities. The perception of needing to be ‘one of the boys’ can prevent girls from entering or remaining in the emergency industry long enough to become leaders.”

Whilst a number of initiatives and strategies can be implemented which focus on targeting particular cohorts (e.g. women) to apply for firefighter roles, focus also must be on the organisation's culture and ensuring the inclusion and acceptance of diversity within the organisation.

Margaret Allison, who recently conducted the independent review into Queensland Fire and Emergency Services' handling of sexual harassment and workplace bullying, will also be presenting at this year's conference on issues of diversity.

According to Ms Allison both the strong cultural traditions of urban fire services and the lack of effective recruitment and retention strategies can limit women joining and remaining in fire services. Although there is a relatively low level of formal complaints, it is clear that many women firefighters have been subject to behaviour that is unacceptable in a contemporary workplace.

In her statement to the Queensland Premier, Ms Allison said “The issues identified in this review have also been identified in recent times in other Australian jurisdictions and in countries such as the US, UK and Canada. Similar issues have been found in other uniform organisations with a traditional command and control culture, such as the Australian Defence Force and its Academy.”

Further, she wrote these industries “have a long and proud history of service, but some of the traditions of the past must be let go to embrace future opportunities, and to ensure the fire service is staffed with the best and most capable men and women.”

But Ms Allison is optimistic that the capacity of the fire service to embrace further change will position them as an industry known as much for its commitment to equity as it is for contributing to community safety. Her session in Adelaide will focus on recommendations for achieving just this.

Ms Henderson echoes Ms Allison’s sentiment believing it is important that as we progress as an industry we seek to improve the participation of women, and the establishment of fairer and more inclusive workplaces.

“As we move into new directions in emergency management we need to support our people and challenge our current culture to ensure that the next generation of leaders has representation of women on par with men.

“Let’s change the culture now so that in 2025 we have an emergency management culture where women, even those who like to wear lipstick, can be operational leaders in the emergency services industry,” Ms Henderson said.

This year’s conference will allow delegates to discuss issues of diversity, share new approaches in an all-hazard emergency management environment, and work together to examine sector reform. Delegates will also explore the challenges and opportunities of ‘shared responsibility’, and seek out new and engaging ways to partner with the community, researchers and the sector to foster and build disaster resilience.

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For further information, go to www.afac.com.au/conference

AFAC15 – Program Highlights

Throughout the conference delegates will hear from a wide range of leading international and Australian experts on issues such as child-centered disaster risk reduction, tropical cyclones, the G20 global summit, Ebola virus disease, re-insurance, information and warnings, planned burning, flood and fire. Speakers already confirmed include:

- Trefor Munn-Venn – CEO, Rhapsody Strategies, Canada
- Dr Rowan Douglas – CEO Capital Science and Policy Practice, Willis Group, UK
- Group Captain Catherine McGregor AM, Royal Australian Air Force
- Dr Paul Willis, Director, RiAus
- Dr Alex Zelinksy, Chief Defence Scientist, Defence Science and Technology Organisation, USA
- Dr Bill Griggs – Director – Trauma Service, Royal Adelaide Hospital
- Dr Mark Finney – Research Forester, US Forest Service, USA
- Paul Boissoneault – Fire Chief, Canadian Association of Fire Chiefs, Canada

Conferencing activities have been scheduled across four days to allow delegates to explore the conference theme New Directions in Emergency Management. On Tuesday 1 September the all-hazards Research Forum will showcase why research and innovation are vital precursors for safer communities and better environmental management. The Forum will showcase the latest science from the Bushfire and Natural Hazards CRC, as well as other organisations within the industry.

Wednesday and Thursday 2-3 September will see delegates participate in the two-day main program. With over 100 sessions scheduled this will be an opportunity for delegates to gain valuable insight into best practice approaches to emergency management. Presentations will focus on research utilisation, case studies, policy and practice. In addition, the conference will feature 6000sqm of exhibition showcasing over 100 leading industry manufacturers as well as the highly valued conference posters.

Six post-conference development sessions will cap off the week. These sessions will provide delegates with the opportunity to participate in master classes and workshops, or travel to more complex sites within the Adelaide region for further learning opportunities.

For more information about the conference including the full conference program, conferencing activities and speaker profiles visit www.afac.com.au/conference or stay updated via Twitter – #AFAC15.

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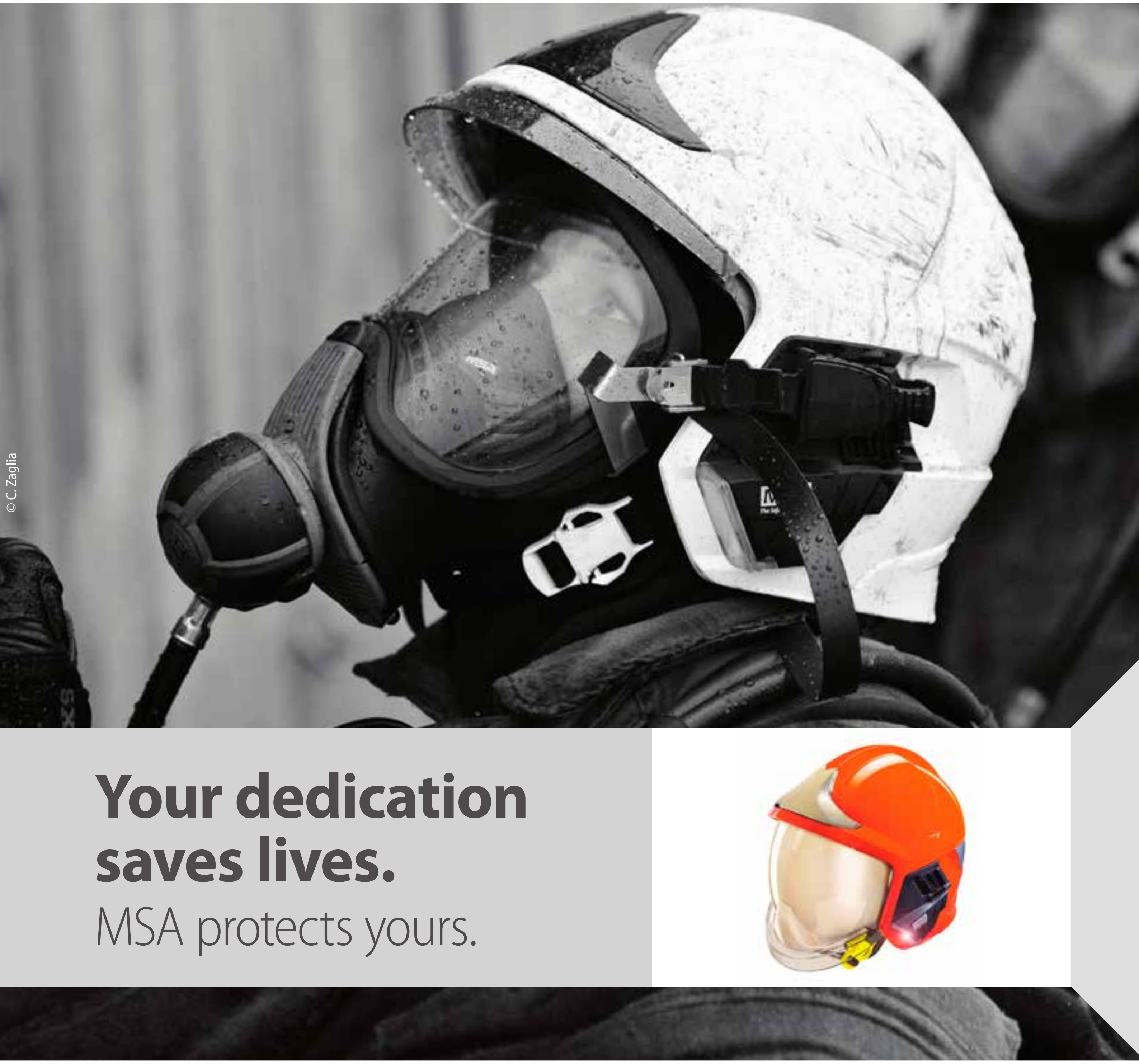

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Bullard Asia Pacific

Booth 175

The Eclipse LDX Thermal Imager offers the latest state-of-the-art infrared engine technology and image processing techniques from Bullard, the leader in thermal imaging for the fire service. Eclipse LDX is the first X Factor Thermal Imager to be released by Bullard. The Company plans to release the T3X and T4X Thermal Imagers later this year.

Firefighters can demo the new Eclipse LDX at AFAC booth #175 and sign-up for a chance to win a Bullard PXAS Fire Helmet with Leather Front. Eclipse LDX is equipped with Image Contrast Enhancement (ICE™) technology for the ultimate image performance in fire conditions. ICE sharpens the distinction between objects and regions and optimizes the image for greater clarity.

The Eclipse LDX runs at an ultra-fast 60 Hertz image update rate and is equipped with a new LCD display that increases brightness and improves contrast, allowing firefighters to see more clearly in thick smoke and direct sunlight. In addition, the Eclipse LDX is equipped with a new power button for easier powering on and off with a gloved hand. Weighing only two pounds, Eclipse LDX is available with a 240 x 180 or 320 x 240 ultra-high resolution infrared engine.

The Eclipse LDX can be equipped with Bullard's exclusive Electronic Thermal Throttle® (ETT), which enables firefighters to reveal hidden fire and distinguish hotter objects with the touch of a button. Other optional features include Super Red Hot colorization, highlighting high-heat scenes in brilliant shades of yellow, orange, and red; temperature measurement; and an integral DVR.

All X Factor Thermal Imagers are eligible for Bullard's upgrade program. The program provides customers who have purchased a Bullard Thermal Imager after January 1, 2007, the opportunity to upgrade their current thermal imager to an X Factor Thermal Imager. For more information about the X Factor Upgrade Program.

For more information, go to www.bullard.com/xfactor/upgrade

Safety Components

Booth 74-75

Safety Components, world leader in flame resistant fabric technology, is proud to bring the next generation PBI outer shell to the international market. PBI Max™ now offers firefighters the world over the best combination of break open and thermal protection, encased within the most flexible and comfortable outer shell fabric the fire service has ever seen. PBI Max delivers maximum performance and mobility in a lightweight twill design. Developed with Safety Components' exclusive Filament Twill Technology™, allowing firefighters to do more without the stiffness and stress associated with conventional outer shell and thermal liner fabrics.

With over 50,000 sets of PBI Max in service globally, PBI Max has now become the #1 selling PBI fiber solution around the world, and the #1 selling outer shell fabric in North America. The list of fire departments and brigades who have already made the switch and propelled PBI Max to prominence includes; Houston, TX, Philadelphia, PA, Pittsburgh, PA, San Diego, CA, Phoenix, AZ, San Francisco, CA, Honolulu, HI, Portland, OR, Seattle, WA, Montgomery, AL, Orange County, CA, Pittsburg, PA, Palm Beach County, FL, Tampa, FL. Outside of the United States, large cities such as Montreal, Canada, São Paulo, Brazil and Bilbao, Spain have also converted.

Filament Twill Technology is also available in the most innovative DuPont™ Nomex®/DuPont™ Kevlar® outer shell fabric ever—Armor AP™ in weights, specifically for the international market and targeted for EN469 standards. Innovative Filament Twill Technology is also at the heart of Safety Components' Glide and Prism thermal liners. These flexible fabrics woven with filament and spun yarns in a twill design are making fabrics made of 100% spun yarns in a rip-stop weave a thing of the past.

For more information, go to www.safetycomponents.com

Burnology I Unite

Booth 192

Burnology develops innovative solutions to complex emergency management problems. Our flagship product "Burnology I Unite" sets a new standard in emergency management communication and coordination. It is a map centric, cloud based, real time mapping, collaboration and information management system for use by Incident Management Teams (office staff) and Incident Responders (field staff) before, during and after emergency incidents.

There are shared maps which office and field staff may add to or modify and observe each others changes in real time. This feature enables real time spatial collaboration between the office and field and real time tracking of field resources. Unite also includes a range of logs, the ability to capture, transmit and store photos and has messaging and tasking functionality. The system 'learns' between successive incidents and facilitates the collection of local knowledge during normal daily activities that is automatically and spatially available in the event of an incident.

While currently configured for bushfire, the system can be quickly configured for any event or emergency. The user interface is simple with minimal training required. The system can be used by individual brigades but is powerful enough to automatically compile data from multiple shared maps to provide agency-wide situation reports making it suitable for enterprise applications. Unite works on any web enabled device including computers, tablets and smartphones without the installation of software. Visit our web site (www.burnology.com) or visit us at booth 192 at the AFAC15 conference for a 30 day free trial.

For more information, go to www.burnology.com

burnology | unite

Bluemont

Booth 157

No water…. the fear of every firefighter. No water, water coming too late or not enough water will make firefighting much more complicated, often more dangerous and sometimes impossible.

Hence we need to have water quickly, lots of it and continuous.

Hytrans mobile water supply as procured by Fire & Rescue NSW is often the solution. Hytrans mobile water supply has proven its value globally for over 25 years.

BLUEMONT
PTY LTD
FIRE | FLOOD | SHELTER

How does it work?

A diesel power pack drives a portable and floating hydraulic submersible pump. The power pack is deployed within 60 meters of a water source (sea, river, creek , dam, tank, hydrant, mains) and the portable pump is placed in the water or connected to the tank or hydrant. The hydraulically driven pump pushes (no suction) the water into a 150mm / 6 inch flexible hose over any distance required. This could be many kilometres. An easy to operate control panel lets the firefighter calculate and determine which pressure and water flow is required. At the end of the hose could be a fire truck, a monitor, a manifold with smaller size manhandled hoses, etc.

The high volume layflat hose can be laid from the back of the all-in-one skid on the fire appliance at 40 km per hour, while hose is recovered mechanically at the speed of 1 km in 30 min. Continuous water flows of over 7,000 litres per min are feasible as well as pressures at the end of the hose of up to 1000 kPa.

For more information, go to www.bluemont.com.au

US Digital Designs

Booth 195

Reducing emergency response times via clear, concise and consistent automated dispatch alerts.

Public safety dispatchers and firefighters will perform their daily routines more confidently knowing that the Phoenix G2 Fire Station Alerting System effectively communicates crystal clear, concise and consistent automated dispatch information to the right personnel, at the right fire station. Thanks to US Digital Designs' effective technology, the Phoenix G2 helps responders shave seconds (even minutes) off response times.

During a dispatch call, the Phoenix G2 automatically sends audio and visual messages throughout the fire station with details about the emergency. This increases a firefighter's situational awareness so they respond with better information, helping save time, lives and property. The system frees up dispatchers to work on other important tasks instead of verbalizing a dispatch or contacting multiple stations, one after the other.

From conception to delivery, the Phoenix G2 system is both flexible and standard. The standard system ships to each station with the industry's most popular station alerting features, yet remains flexible through the configuration modules, meeting the unique culture of each station. For example, the zoning feature can only awaken only on-call units with ramped tones and lighting, so non-dispatched crews can get the rest they need.

The Phoenix G2 offers built-in features and abilities; multi-year, 24/7 proven reliability; hassle-free installation; web-based remote configuration and control; and virtually zero maintenance. USDD's engineers can communicate via email, text and manual logs, as well as via the Phoenix G2 FSA mobile app. North American and Australian support partners are also available for installation.

For more information, go to www.stationalerting.com

Working on Fire

Booth 162

Working on Fire (WoF) in Australia is part of an International Company specialising in the provision of Integrated Fire Management Services globally. The Company has extensive experience, expertise and capacity in delivering solutions across all aspects of fire management. Interventions and projects range from large country scale projects to small, bespoke solutions to all industry sectors affected by bush and wildfire.

Working on Fire operates from strategically located operational bases across Australia that will not only provide support and capacity to both government agencies and volunteer brigades where required but will also provide the full range of Integrated Fire Management Services to reduce the risk to our communities and the damage to our environment.

Working on Fire is committed to safer communities, sustainable environment and protection of property. This is achieved through robust planning risk identification and mitigation and committed high performing and well trained staff.

WoF provides the following Integrated Fire Services

Prescribed Burning, Fire Management Plans, Fire Suppression, Fire Management Training, Wildfire Research, Wildfire Risk Management, Fire spread modelling, Risk assessments, Bushfire Attack Level Assessments, Flora & Fauna Surveys, Fire Detection systems, Fire Training, Fire Hazard Mapping, Bush Fire Prone Area Mapping, GIS Mapping.

WoF also provides the following Forest and Environmental Services

Establishment, Roading, Silverculture, Fire Management, Post-Harvet Operations, Vegetation management.

Training

WoF provides a range of training courses and qualification in Fire Management, Emergency Management and OHS and First Aid

For more information, go to www.workingonfire.com

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lhdaustralia@lhd-group.com . **www.lhd-group.com**

Safety Equipment Australia

Booth 184-185

SpiroCART from Safety Equipment Australia is a BA backpack on wheels. Instead of carrying cylinders on your back, the trolley allows you to wheel your cylinders around on a light-weight, highly mobile trolley. This may come in handy if you are working for extended periods.

SpiroCART can carry one or two cylinders of varying sizes ranging from 3 to 9 litres. If two cylinders are fitted, an empty bottle can be rotated while breathing air from the other. This means that there is no operating time limit.

The robust and durable trolley can be used upright or laid-flat and features an extendable handle. The trolley itself weighs only 8 kg. It can also be fitted with an optional 25-metre hose wheel.

The central part of the trolley, the air manifold, is detachable and can be used in several ways, including:

- Mounted on SpiroCART — mobile cylinder trolley
- Wall-mounted — connected to large G-size cylinders
- Hand-held — mounted on metal cradle with carry handle

The manifold features a pressure gauge, two connections for single or twin cylinders, two breathing-air outlets, as well as a warning whistle that sounds when air pressure is low.

Another two breathing-air couplings can be fitted to the manifold, giving a total of 4 outlets.

The SpiroCART manifold allows the user to manage bottled breathing air in a variety of fashions without any permanent modifications to the equipment.

For more information, go to www.sea.com.au

Global Fire Solutions Pty Ltd.

Booth 163-164

Darley have supported AFAC since its inception by being an Exhibitor at every conference.

In 2015 Darley will support Darley Australia with Troy Carothers, CAFS Specialist, participating in the CAFS forum to be held as part of the AFAC conference stream.

A Darley Odin Weapon CAFS module will be on display along with HM500 and 2.5AGE pumps.

Troy will tour Australia straight after the AFAC Exhibition and demonstrate the Odin Weapon CAFS module.

Darley Australia is the International Sales and Marketing office for Darley HQ USA and a Division of Global Fire Solutions Pty Ltd.

Global Fire Solutions director Trevor Wing has been associated with Darley since 1983 and instrumental in securing the Darley agency rights for Australian Fire Company in 1988. In 2000 Australian Fire Company closed its doors and Global Fire Solutions then assumed responsibility for all Darley products along with Bronto Skylift HEP's from Finland for the Australian market. Since then Global Fire Solutions have also secured agency rights for PolyBilt, FRC / FoamPro, PyroLance and Harrison Hydragen, all of which will be displayed at the Darley / Bronto / GFS booth.

Darley pumps are currently in front line service in all States and Territories of Australia in Metropolitan / Rural Fire Service, Mining and Defence sectors.

Renowned for their high level of design engineering, reliability and strong after sales support there are many hundreds of pumps still performing to specification after many years of service."

For more information, email twing@picknowl.com.au

Stewart & Heaton Clothing

Booth 79-80

In its 25th year of operation Stewart & Heaton Clothing (S&H) continues to evolve to meet the emerging needs of the Fire and Emergency services sector in Australia. As a locally owned and operated company we have a proud history of working with fire agencies to develop solutions to their current and future needs. The S&H difference relates not just to the product but the total service package. In an ever changing industry stability, performance and reliability are critical to the agencies and their end users. S&H continue to invest in people, technology and systems to ensure we remain at the forefront with our total supply package. S&H are proud to have introduced a number of industry firsts;

Est. 1991
S&H
AUSTRALIA

- First Australian company to be licenced to manufacture and supply Certified Product to Australian Standards for Structural (AS 4967) and Wildland (AS 4824) garments.
- First company to introduce Wildland garments that incorporated the recommendations of Project Aquarius.
- First company to introduce a two piece ensemble, fire trim tape and "comfortable" flame retardant fabric to the Wildland sector.
- Successfully completed the largest rollout (at the time) of new generation Structural firefighting garments.
- First Australian company to introduce RFID technology into PPC & E for the fire sector.
- Introduced the most comprehensive asset tracking system in Australia for the fire market-LOGIC.
- First and only company to offer and support a comprehensive nationwide supply solution.
- First company to roll out inherent flame retardant fabrics to wildland fire agencies in Australia.
- First company to introduce a comprehensive on-line ordering and garment management system to fire agencies in Australia.

To find out what's new from S&H including the AFAC launch of "Fire Cam"-wearable video streaming solutions, visit Booths 79 & 80 at the AFAC Exhibition hall.

For more information, go to www.shcc.com.au

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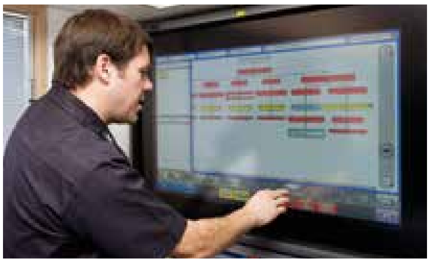
VectorCommand

Booth 200-201

VectorCommand is an international command & control operations and training company, offering the software solutions of choice for incident management professionals in the emergency and security services as well as in the nuclear, chemical and oil & gas industries.

Over the last 15 years the company has built a reputation for its development of highly innovative technologies for supporting collaborative and coherent ways of working together. The companyís focus is on three key product groups:



- Operational incident command, control and communications;
- exercising single and multi-agency incidents;
- simulation training for incident command.

Originally known and respected for the Tactical Command Trainer fire simulator training solution and the Training & Exercising System software, we are now perhaps even better known globally for our Command Support System (CSS), recognised as the worldís most advanced, interoperable and resilient incident management system for emergency services and emergency management organisations.

CSS transforms the effectiveness of incident command, control, communications and information management by providing dynamic situational awareness delivered through a Common Operational Picture to incident commanders in the field and to the central control room. This results in more informed, and therefore better, decision-making. CSS also significantly strengthens collaboration between different emergency agencies, as well as regional and national government.

VectorCommand offers tried and tested solutions that are used operationally by many of the worldís leading emergency services, including the South Australian Metropolitan Fire Service, Qatar Petroleum, UK Atomic Weapons Establishment and London Fire Brigade in over 3,000 incidents of all shapes and sizes.

For more information, go to www.vectorcommand.com

Solberg

Booth 186

Solberg is your one-stop resource for firefighting foam concentrates and custom-designed foam suppression systems hardware. An Amerex Corporation company, Solberg offers an extensive line of sustainable environment-friendly firefighting foam concentrates. SOLBERG Foam Suppression Systems Hardware is engineered by a team with over 225 years of combined in-the-field fire protection experience.

- RE-HEALING™ foam is an innovative, high fire performing fluorine-free firefighting foam used to extinguish Class B fuels. RE-HEALING foam can also be used to prevent re-ignition of a liquid spill and control hazardous vapors. SOLBERG RE-HEALING foam concentrates are designed to replace traditional AFFF and AR-AFFF foam concentrates and older fluoroprotein foams. Concentrates are available in 1%, 3%, 6% 3x3% ATC™ and 3x6% ATC™ formulations.
- The first U.S. Environmental Protection Agency Stewardship Program – 2015 Compliant C6 Foam Concentrates. Intended for use on Class B hydrocarbon fuel fires, ARCTIC™ AFFF foam concentrates are available in 1%, 3% and 6% formulations. ARCTIC ATC foam concentrates are intended for use hydrocarbon and polar solvent fuel fires. Concentrates include 1X3%, 3x3%, and 3x6% ATC formulations.
- FIRE-BRAKE™ foam concentrate from SOLBERG meets NFPA 1150 and is listed on USDA Forest Service (USFS) Qualified Products List (QPL). FIRE-BRAKE foam concentrate is a synthetic firefighting foam concentrate specially designed to be used for wildland, structural and other Class A fuel fires. The foam concentrate is biodegradable and non-toxic, so it is environmentally sustainable.
- FIRE-BRAKE foam concentrate has the ability to reduce the surface tension of water, which substantially increases water’s overall wetting capability. This creates a faster penetration and greater fire control when attacking combustible Class A fuels. FIRE-BRAKE foam concentrate is proportioned at a rate of 0.1% - 1.0% in fresh, salt or brackish water.

At Solberg, we continually pioneer firefighting foam technologies to meet the latest demands of the aerospace, aviation, chemical, defense, energy, fire services, marine, mining, oil and gas, petrochemical, pharmaceutical, pipeline, solvent & coatings and utilities industries.

For more information, go to www.solbergfoam.com

PAC Fire

Booth 106-111

PAC FIRE AUSTRALIA is a nationwide distributor with branches located in Queensland and South Australia and representatives in Victoria and Western Australia. PAC FIRE AUSTRALIA prides itself on being a leader in the supply of equipment to many different industry sectors specialising in the Emergency Services.

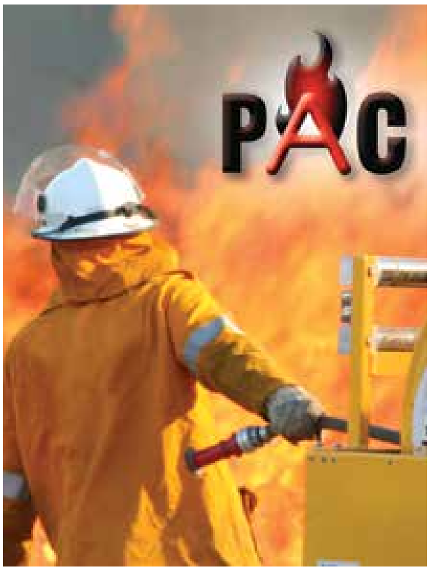
At PAC FIRE AUSTRALIA, taking pride in what we do and the people we serve is how we define our business. Our commitment to providing quality products, customer service and sales expertise to our customers with precise information is second to none. When called upon by customers our product solutions and services produce value for money and achieve operational success.

Having trouble sourcing a product then look no further, as PAC FIRE AUSTRALIA specialises in finding a solution for you. One of our specialties is sourcing or manufacturing that product which you just can’t locate or if required we will develop or design a solution for your needs.

PAC FIRE AUSTRALIA can also provide a detailed care and maintenance program for your PPC. We can offer something as simple as a helmet inspection to a more detailed complete annual garment decontamination service. All you need to do is call us and we will be happy to work out the right program for you.

PAC FIRE AUSTRALIA prides itself in supplying quality products from leading manufacturers using the latest technologies. All of our products are backed with superior warranties and certified to all the latest standards where applicable.

For more information, go to www.pacfire.com.au



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Solberg RE-HEALING™ Foam not only provides the performance you are accustomed to with current firefighting foams, and rely on, it's also safe for your firefighters and the environment. RE-HEALING Foam has superior vapor suppression and longer drain time for better burn-back resistance. The first true fluorosurfactant and fluoropolymer-free foam, there are no environmental concerns for persistence, bioaccumulation, or toxic breakdown.

Learn more about RE-HEALING Foam and 1%, 3%, 6%, 3x3% ATC and 3x6% ATC concentrates available at **solbergfoam.com**

Visit us at: AFAC15, Booth 186
1st-3rd September 2015 • Adelaide, South Australia

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Australia
Tel: +61 2 9673 5300

Varley Group

The Varley Group is Australia's largest specialised vehicle manufacturer, supplying appliances for many government organisations and private industries, both domestically and globally. Varley's manufacturing capabilities include fire and rescue appliances, trailers, industrial units, ambulances, prisoner transport vehicles, mobile health clinics, road side assistance vans and many more.

Throughout the past eighteen months, Varley has developed the Next Generation Modular Fire Appliance; all designed and manufactured by Varley's Victorian branch, SEM Fire and Rescue, based in Ballarat. The new concept was revealed as part of a national Australian tour, in which the appliance was demonstrated in various states.

There are numerous key advantages to this new style of appliance, which combine the latest technologies with contemporary industry demands. Integrated breathing apparatus seats inside the truck cabin, as well as crew protection spray systems and curtains, ensure ultimate crew and passenger safety. The truck cabins can also be produced as either single or dual cabs, depending on your crew's requirements. One controller area network (CAN) bus system ensures that every tech feature within the appliances communicates with one another effectively and without delay.

In addition, SEM's Medium Pumper is another popular and versatile option. Standing at 3 metres high, 8 metres long and 3 metres wide, the Medium Pumper offers an adaptable alternative for both urban and rural communities. In order to provide ample water for the first attack, the Pumper contains a 4000LPM PTO Pump, a 2500 litre water tank and 300 litre B Class foam tank. In addition, with two breathing apparatus seats in the cabin, state of the art warning light systems, reflective signage, plus LED body and internal locker lighting, crew and external safety is a key focus of the design.

Due to the standardised modular approach, both vehicles are also compact in size, which ensures efficiency of use and significantly reduced operational difficulties. Using a mix of modules allows a high level of customisation for each individual appliance within a fleet, without a hidden developmental cost in the capital expenditures.

Finally, all Varley vehicles and appliances are custom developed to meet clients' strict and unique risk profiles at each site, and are manufactured to withstand the rigours of a wide variety of emergency response scenarios.

For more information, go to www.varleygroup.com

Fire Protection Technologies

Booth 165

Fire Protection Technologies is the largest independent supplier of special hazard fire protection product, design and engineering services in Australia, New Zealand and Asia Pacific. In conjunction with our 'whole of life' approach to our product range, technical support, design and engineering solutions available throughout all stages of a project from development to delivery, we will continue to provide ongoing support for the life of the product.

Our comprehensive range of fire detection and suppression products include the Insight Robotics infra-red, geo spatial imaging system that is able to detect a 1 metre x 2 metre fire in a forest 5 kilometres away. The Class A and Class B foam concentrates available include both the high performance "C6" fluorinated foams as well as fluorine free foams as well as foam storage containers / tanks, foam monitors, foam system distribution and proportioning hardware. Barricade Fire Blocking Gel is the most effective and environmentally benign gel available and is manufactured entirely from food grade materials.

For any particular application there can be a number of possible solutions. Talking to fire engineers that specialise in foam products should be your first stop in achieving the best result for your application.

Our philosophy "Every solution for your special hazard problems" drives us to continue searching the world for the highest quality products to combine with our existing product range in order to provide the best possible solution for your special hazard problems to protect people, property and business continuity from the hazards of fire and explosion.

For more information, go to www.fire-protection.com.au

LHD Group

Booth 115-116

LHD Group Australia is an ISO 9001 accredited professional and protective clothing and services provider that has been catering to the Australian/NZ; Fire, Emergency/Rescue, Protection, Defence, Resource & Professional/Corporate industry sectors for over a decade.

We are a subsidiary of LHD Group GmbH, a leading global system provider in the management of professional and protective clothing and footwear. LHD Group's global sourcing and procurement capabilities allow us to leverage from our strategic global supply chain to provide "Tip to Toe" solutions and access to latest technologies, innovations and licences supported by our own qualified Quality Assurance technicians.

Whether uniforms & combat clothing, protective equipment, work wear or corporate fashion – by means of the combination of process optimization and logistic performance we can offer our customers a worldwide, all-encompassing and cost-efficient clothing management.

Our Products

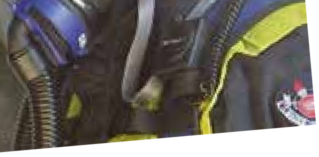
Design and supply of professional and protective clothing items incorporating the latest designs, technologies and innovations and catering to the; Fire, Emergency/Rescue, Protection, Defence, Resource & Professional/Corporate industry sector

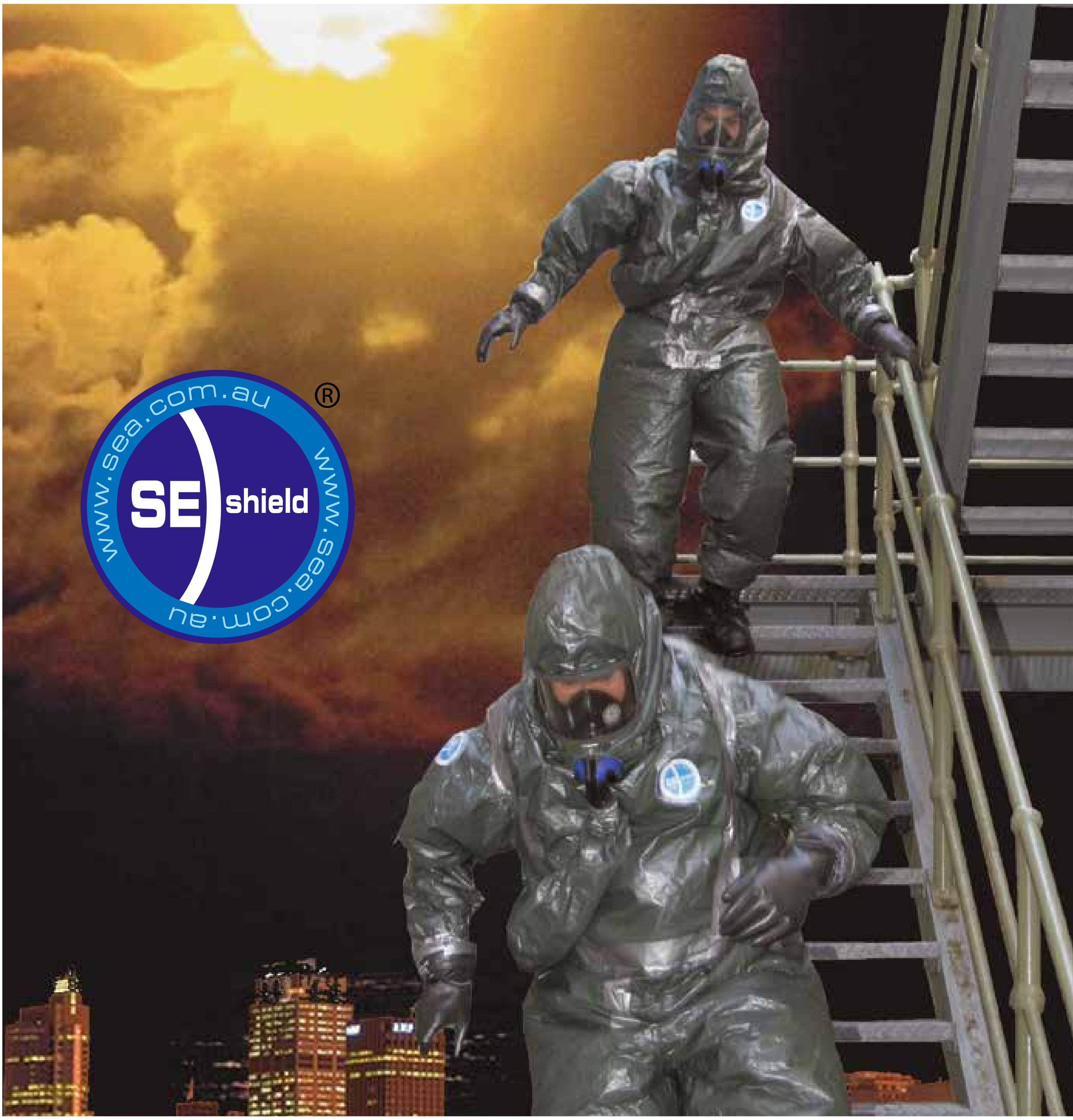
TotalCare® Service

LHD Group employs a direct supply and TotalCare® system for numerous international and Australian clients for the supply, distribution/wardrobe management, care, laundering, repair and maintenance of all clothing/PPC and footwear items. The very essence of the TotalCare® model is to add maximum value, by optimised and expert coordination of clients clothing/PPC supply and wardrobe management system. The LHD Group pioneered this concept close to two decades ago and is field proven globally with TotalCare® centres operational across the globe.

For more information, go to www.lhd-group.com

Respiratory protection for first responders





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- Charles de Gaulle Airport – Paris
- Singtel Datacenter – Singapore
- Substations – Qatar
- AL Ain University - UAE
- Harvard University – USA
- Princeton University – USA

At STI, we are committed to delivering the most comprehensive line of innovative and reliable firestop solutions across a broad range of segments and industries worldwide. With best-in-class service and support, we are the preferred choice of specialists. Contact us today to experience the STI difference.

www.stifirestop.com

& FIRESTOP SPRAY

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PLASTIC PIPE - FIRESTOP SEALANT

DATA CABLES - EZ-PATH®

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Firelogistics Booth 16

firelogistics is the firefighting and public safety equipment division of RAPP Australia Pty Ltd. The brand was set up as a means to develop, manufacture and supply high performance firefighting equipment and rescue gear, as well as distribute the most effective, reliable and safe to use fire equipment from around the world.

firelogistics products are in service in many firefighting and emergency services around Australia and also internationally. RAPP Australia holds current and ongoing contracts with many government departments and private clients for the provision, repair and product development of many firefighting equipment products and rescue gear.

Based in Lara near Geelong, our family owned manufacturing business is ISO 9001:2008 accredited and firelogistics is committed to the continued support of fire, police, medical and emergency services staff through sourcing, designing, manufacturing and distributing the highest quality firefighting equipment and rescue gear possible.

If you would like to know more about what firelogistics can do for you, visit us at AFAC '15 Booth 16. Or please call +61 3 5284 0222

For more information, go to www.firelogistics.com.au

Kidde Australia Booth 76-78

Kidde Australia is once again proud to support AFAC as an exhibitor at the 2015 Conference and Exhibition.

This year Kidde will be showcasing a range of new products (with a few surprises) from key partners including Angus Fire, Holmatro, Respirex, MFC, Blazetamer, Flir and Protek.

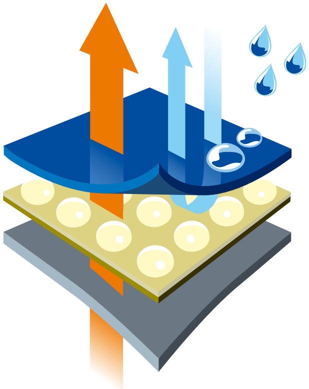
With a number of experts on hand, product displays will be interactive enabling attendees to 'touch and feel' equipment, giving them a true indication of the quality of the range.

Kidde Australia supplies products and expertise across the entire spectrum of fire detection, suppression and firefighting. It offers a comprehensive range of firefighting equipment including the leading Angus Fire Duraline fire hose and foams, state of the art rescue tools from Holmatro, chemical and gas suits from Respirex and new firefighting technology in Blazetamer 380.

Kidde Australia is part of UTC Building & Industrial Systems. At UTC Building & Industrial Systems, we work each day to make the world a safer place. Through our portfolio of world-class brands, we provide innovative fire safety and electronic security solutions that protect people, property and assets around the globe. Our fire detection and suppression technologies protect a range of premises—including homes, hotels, data centres, shopping centres, offices, oil rigs and more.

For more information, go to www.kidde.com.au

W.L. Gore Booth 88



GORE-TEX® Heat and Flame garments for firefighters cover a wide range of extremely durable and long-lasting turnout jackets and trousers. Garments exceed industry standards for waterproofness and resistance to heat and flame. They provide firefighters with an increased level of comfort that is proven to enhance performance.

The GORE-TEX® moisture barrier is in a garment to perform key tasks simultaneously: The first is to prevent firefighters from getting wet from the outside in. The second is to keep the thermal insulation material dry, preventing build up of body moisture that could reduce the level of protection from scalds. This means that the firefighter is more comfortable wearing their garment and has a slower body core temperature rise.

The pores in the GORE-TEX® moisture barrier are 20,000 times smaller than a droplet of water but 700 times larger than a molecule of water vapour from perspiration.

Enhanced GORE-TEX® Heat and Flame garments with AIRLOCK™ Spacer Technology exceed industry standards such as EN469 and NFPA. They reduce heat stress and weight, thus increasing freedom of movement and helping firefighters to focus on the job.

For more information, go to www.gore.com

Scania Australia Booth 82-87

Scania Australia celebrates a decade of unbroken support as a major sponsor of AFAC in 2015.

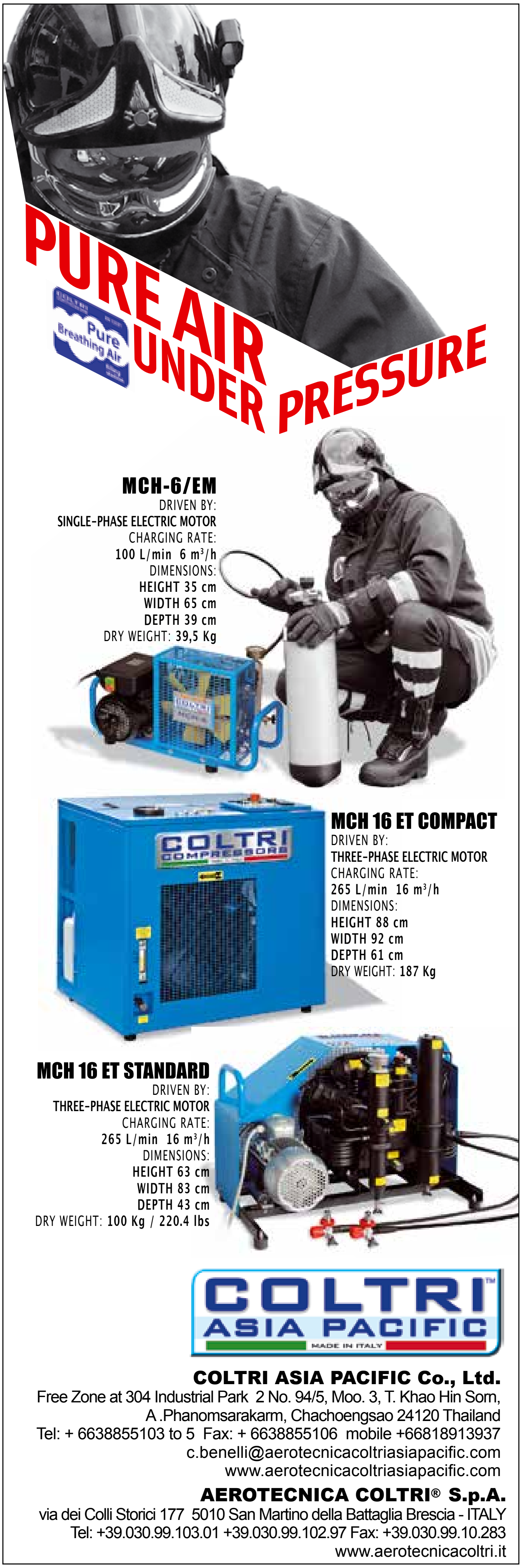
Scania has 650 firefighting vehicles on duty across Australia, and is leading the roll out of Euro 6 emission vehicles generally. Canberra already has a fleet of 77 Scania Euro 6 compliant buses in service, and TNT has Scania Euro 6 B-doubles on the road, too. During 2015, the first Scania Euro 6 fire engines are arriving, destined for the Melbourne Fire Brigade. A fleet of 6 P370LB6x4MNA heavy tanker pumpers with bodies from Fraser Fire & Rescue in New Zealand joins a P410LB8x4HNB Bronto Aerial vehicle, as well as a P410LB6x4HNA Ultra Large Pumper Tanker built by SEM in Ballarat, Victoria. This is a prototype with scope for wide future application.

Both 370 hp and 410 hp Euro 6 engines are the first of their type delivered to any Australian customers, and are based on Scania's modular 13-litre engine. The 370 version uses both EGR and SCR emission control technology, while the 410 hp engine is SCR only.

"Scania is delighted that the MFB is leading the way with environmentally friendly vehicles, well ahead of legislative requirements," says Shane Griffin, Scania Australia National Sales Manager Specialist Vehicles.

"We look forward to explaining the benefits of this technology to the AFAC attendees."

For more information, go to www.scania.com.au



MCH-6/EM
DRIVEN BY:
SINGLE-PHASE ELECTRIC MOTOR
CHARGING RATE:
100 L/min 6 m³/h
DIMENSIONS:
HEIGHT 35 cm
WIDTH 65 cm
DEPTH 39 cm
DRY WEIGHT: 39,5 Kg

MCH 16 ET COMPACT
DRIVEN BY:
THREE-PHASE ELECTRIC MOTOR
CHARGING RATE:
265 L/min 16 m³/h
DIMENSIONS:
HEIGHT 88 cm
WIDTH 92 cm
DEPTH 61 cm
DRY WEIGHT: 187 Kg

MCH 16 ET STANDARD
DRIVEN BY:
THREE-PHASE ELECTRIC MOTOR
CHARGING RATE:
265 L/min 16 m³/h
DIMENSIONS:
HEIGHT 63 cm
WIDTH 83 cm
DEPTH 43 cm
DRY WEIGHT: 100 Kg / 220.4 lbs

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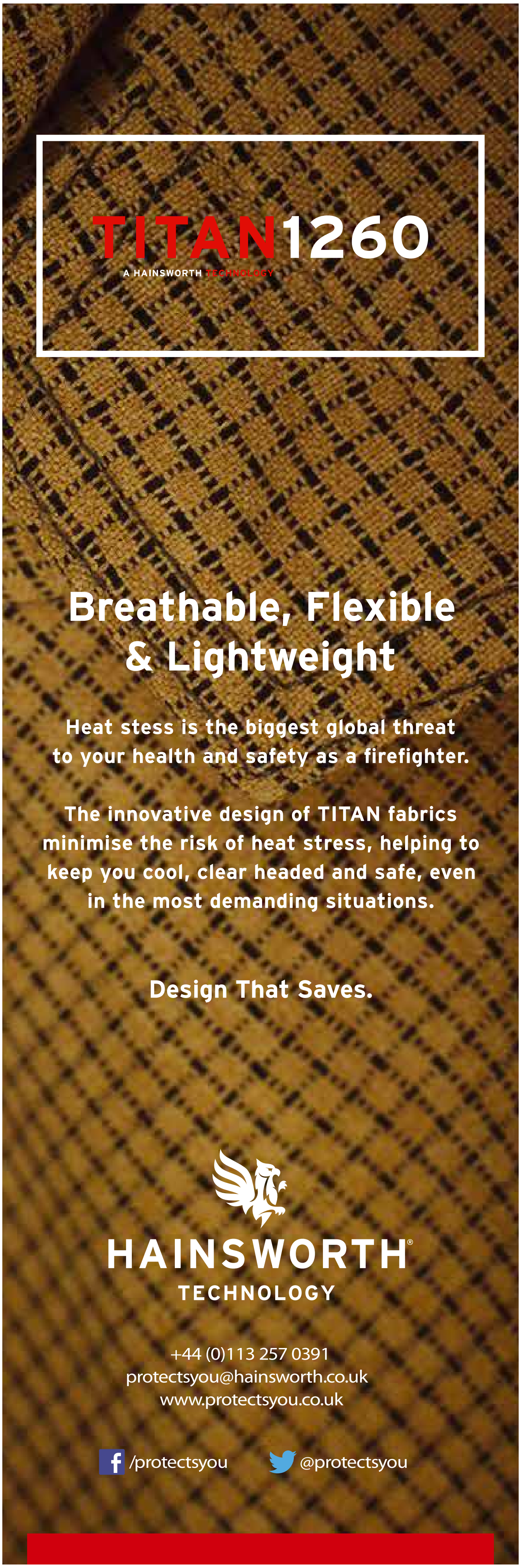
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Heat stess is the biggest global threat to your health and safety as a firefighter.

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Task Force Tips Booth 39-40

If you are looking for the latest technology in high performance firefighting equipment, and are attending AFAC15, you need to look no further than the Task Force Tips and GAAM exhibition stands for a glimpse into the future. Since 1968 TFT has been designing, manufacturing and through our local partner GAAM, distributing innovative fire suppression tools for emergency service professionals throughout Oceana.

From handheld nozzles, to portable, fixed, or remote control monitors, water supply appliances or foam injection and application equipment, Task Force Tips is known worldwide for our rugged durability in the harshest of conditions. From bushfires, to structural and high-rise operations, TFT and GAAM can provide you with a water flow solution for your most challenging suppression operations.

Please stop by the Task Force Tips stand to see the newest innovation; the IMPULSE™ Trigger Valve System. Challenging the status quo of traditional firefighting nozzle design, the IMPULSE™ System can be integrated into many of TFT's nozzles, including our newest "pulsing" and CAFS models. So, take a moment and stop by either the GAAM or Task Force Tips stands and take a glimpse into the future of firefighting.

For more information, go to www.tft.com

Motorola Solutions Booth 132

The public safety environment is becoming more challenging and complex for first responders and become more complex. Those pressures include continued cost and resource constraints, dealing with new and emerging threats to community safety and heightened community expectations that agencies will make use of new information sources including social media to keep out communities safe.

However, those pressures can be overcome by making better use of the masses of data available in our cities today. By securely capturing and analyzing the information within our cities and sharing it over intuitive applications, a choice of devices and the best available networks, Australia's public safety agencies can deliver better frontline operational outcomes and reach new levels of productivity and safety.

Operational environments can be transformed through context-aware technology solutions that provide firefighters with solutions that interact and respond to their operational environment.

At its very heart, this is about ensuring the technology used by frontline firefighters can adapt to their dynamic environments in highly effective ways so that all interactions become second nature.

At AFAC 2015, Motorola Solutions will reveal its vision for the future of public safety operations – Next Generation Mobile Intelligence, and how an ecosystem of context aware technologies can deliver a better of technology experience for every first responder.

Please visit us at our conference stand to see our technology in action and learn about the difference it can make in delivering better operational outcomes for public safety.

For more information, go to www.motorola.com.au

Hainsworth Booth 117

Hainsworth is showcasing a number of innovative product developments at AFAC. Among them will be a range of new colours for our ECO-DRY Shield technology to enable us to extend the range into the industrial sector.

ECO-DRY consists of solutions – both outer shell and linings – and harnesses the many benefits of wool. The products have been engineered to combine the unique properties of wool, Nomex, Kevlar and Lenzing FR.

ECO-DRY Shield's lightweight single-layer construction has proved hugely popular with wildland firefighters in Australia providing them with mobility, flexibility, comfort and maximum thermal protection in the most demanding of conditions.

Other product developments include TITAN 1260 which complements the existing 1220 and 1250 systems by adding flexibility after flashover with the fabric remaining flexible with minimal carbonisation, ensuring the garment remains intact and does not break open after exposure to flame and cooling down. TITAN 1260 has successfully undergone trials which have demonstrated its enhanced breathability, durability and protection.

The PBI, DuPont Nomex and DuPont Kevlar combination contains a specially developed yarn to provide a smoother fabric surface which reduces fibrillation and consequently improves airflow to ensure maximum breathability and comfort. Hainsworth is also showcasing an advance in the durability of its REPEL + technology, a special coating applied to a standard outer shell fabric, which keeps firefighters dry and comfortable without affecting the breathability of PPE.

For more information, go to www.protectsyou.co.uk

10 Tanker Air Carrier Booth 37

In 2006 10 Tanker Air Carrier introduced a new asset to the Wildland Fire Industry in the form of a DC-10 wide-body jet, setting new standards for capacity, speed, safety and cost effectiveness. With these attributes in play, fire managers recognized the tremendous efficiencies the DC-10 brings to the mission, and how this single tool can keep fires smaller and less destructive for both the ecosystem and their constituents.

The performance of the DC-10 increases the lift capacity 4 to 1 over the next largest retardant tanker. By bringing four times more retardant to the line in a single flight, fires can be extinguished more quickly and risk exposure limited for both pilots and ground personnel. At the same time, these efficiencies reduce the cost per gallon delivered by half, an important figure for budget conscious fire managers. More to the point for firefighters on the ground, the effectiveness of the DC-10 represents the most significant innovation in aerial fire suppression since the introduction of tanked skycranes.

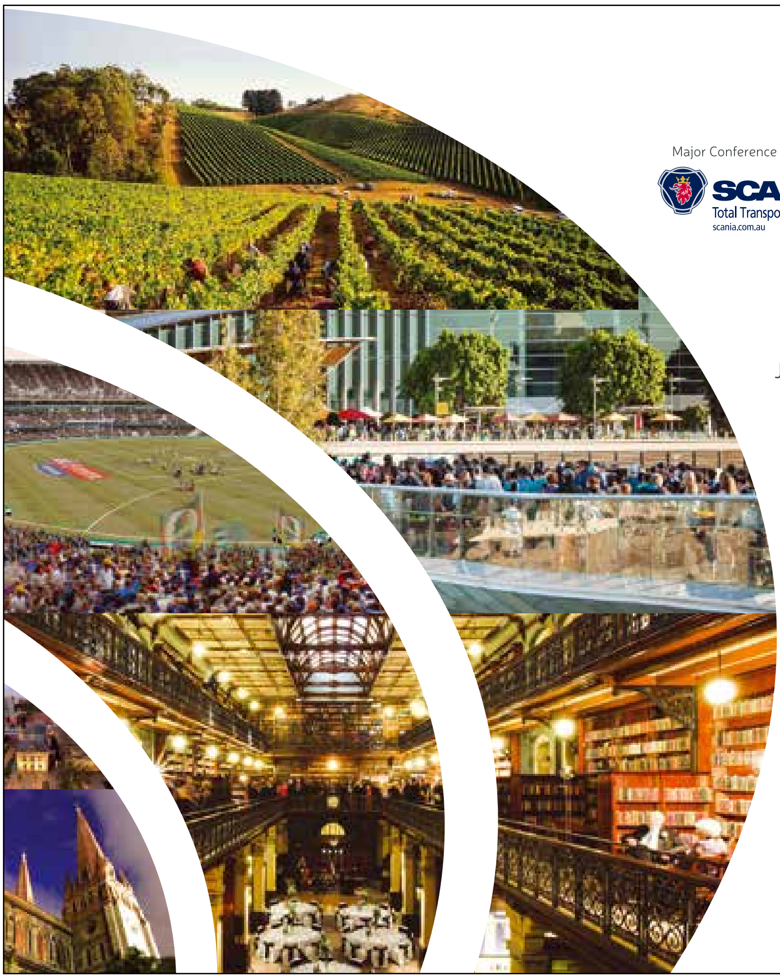
10 Tanker DC-10s have operated on wildfires across the United States, Canada and Australia. They have dropped retardant in every type of terrain ranging from the Sierra to Texas, and the Pacific Northwest to the Rockies, everywhere finding high praise for the dramatic effectiveness of these modified and fully certified aircraft.

10 Tanker Air Carrier continues working to enhance what is already the safest, most effective airtanker available, and plans to expand its scope of operation to serve firefighters around the globe.

For more information, go to www.10tanker.com

Kidde
United Technologies

Visit Kidde Australia at AFAC 2015
to see why Kidde is the name to trust to protect against the effects of fire and its related hazards.



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Join us for the 2015 conference to be held at the Adelaide Convention and Exhibition Centre, for Australasia's largest and most important emergency services and public safety conference and trade expo.

The theme for the 2015 conference is **New Directions in Emergency Management.**

The approach to emergency management is rapidly evolving, and with it the need for better knowledge and understanding. Driven in part by the escalating cost and complexity of major incidents, the emphasis is shifting towards a holistic view that encompasses research, readiness, risk reduction, response and recovery. At the same time, our emergency service agencies are being comprehensively reformed to improve their effectiveness before, during and after a major event.

afac.com.au/conference

SASGAR Booth 142-147

Sasgar Fire and Rescue Pty Ltd is an equipment sales and service provider that specialises in Fire and Rescue vehicles, equipment and personal protective equipment. The company manages the Australia, New Zealand and the Pacific Islands agency for several premium quality suppliers such as Rosenbauer International AG, Weber Rescue Systems and FLIR Thermal Imaging Cameras .

Sasgar Fire and Rescue and their suppliers will be launching a range of exciting new products this year at AFAC 2015 including a new innovative Rosenbauer firefighting vehicle with exceptional performance, safety and reliability capabilities, a tough new range of new Weber Rescue tools unseen in Australia and the most recent Rosenbauer PPE and equipment range. In addition Sasgar will be showcasing the latest thermal imaging cameras from FLIR with the K55 and K45.

The new Rosenbauer firefighting vehicle will be seen for the first time at AFAC 2015 and following on from AFAC will be going on an Australia wide tour visiting many different Fire stations across States and Territories.

To experience some of these great new products and to have a chat to some of the friendly staff about the products and services Sasgar provide, visit booth number 141 – 148. For more information please contact Sasgar on 07 3869 7000 or sales@sasgar.com.au.

For more information, go to
www.sasgar.com.au

PBI Booth 151

PBI Performance Products protects thousands of firefighters around the world in Europe, Scandinavia, Australasia and USA. They place their trust in PBI fabrics to deliver the necessary high performance that keeps them safe.

PBI fabrics are internationally renowned for their exceptional flame resistance and thermal protection from radiant heat, built on a 30-year heritage of technical excellence and innovation.

PBI will demonstrate the full range of its protective fabrics at AFAC this year, including PBI Gold, PBI Matrix, PBI Max, Gemini XTL and Titan 1260.

The company's specialist 'next to skin' fabrics will also be on display. PBI TriGuard fabric delivers excellent protection against heat, flash fire and arc flash. PBI BaseGuard is a flame resistant, no melt, no drip economical moisture wicking base layer.

All PBI fabrics are lightweight, strong and achieve a high standard of flame resistance. They will not become brittle, shrink or break open when exposed to flame and high temperatures. This also means that the integrity of the internal layers of the garment is protected and the transfer of any radiant heat is slower, allowing more time for firefighters to escape to safety in a situation such as a flashover. The variety and flexibility of the PBI range is testament to their ability to create strong partnerships that result in products that meet the different needs of the end user.

For more information, go to
www.pbiproducts.com

MSA Booth 152-153

MSA
The Safety Company

Featuring at AFAC 2015 the MSA Gallet F1 XF Structural Fire Fighting and Rescue Helmet is at the forefront of helmet safety technology and has been developed for firefighters, with firefighters.

Designed to meet international safety standards including EN, NFPA and AS/NZS, the MSA fire helmet is readily available in all continents to meet the toughest requirements of firefighters from around the globe. The modular platform of the helmet ensures MSA can individually customise a solution for you whilst integrated communication options further enhance the capability of your teams.

MSA Australia will supply the Gallet F1 XF Structural Fire Helmet to more than 6,800 fire officers located around New South Wales. The new equipment features in-built radio technology and lighting, which provides firefighters with greater protection and clearer communications during emergency situations. The new helmets enable firefighters to clearly communicate with each other, even when wearing self-contained breathing apparatus.

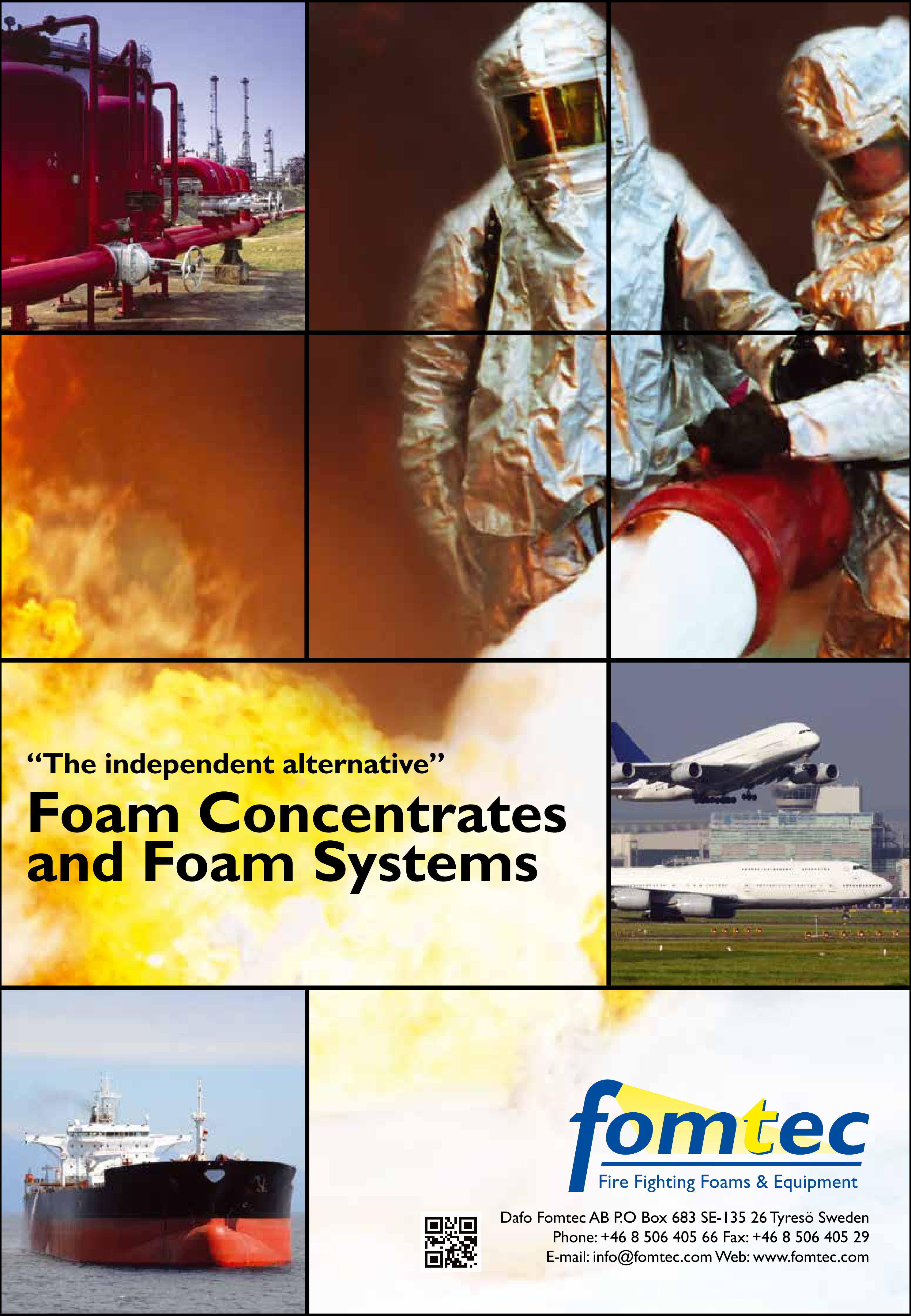
For more information, go to
www.MSAsafety.com

Ferno Booth 89-90

Ferno developed the first one-man stretcher over 50 years ago and we've been bringing you cutting-edge products ever since. No one can predict when emergencies will happen. But Ferno can help you prepare for it. We've manufactured and sourced a complete suite of products for rescue, ambulance and safety. We firmly believe we're bringing you the very best available - the only Australian company offering you such depth of choice.

Well-designed and well-built products are our cornerstones. We do all we can to ensure the products we offer are consistently reliable and suited to the job. That includes listening to industry when developing new products and continually refining them after launch to make them even better. With Ferno you get the best of both worlds - international expertise and resources, enhanced with local knowledge and accessibility. A dynamic pair from our founding family - Scott West and Alan Ferris, manages Ferno Australia. They bring decades of experience and stability and uphold Ferno's tradition of strong customer and after-sales service. Because when it's critical, you can count on Ferno.

For more information, go to
www.ferno.com.au



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Scott Safety

Booth 54/67

Scott Safety is a world leader in the design and manufacturing of high performance respiratory protection products, monitoring and sensing equipment and other personal protective solutions. Scott Safety's comprehensive range of equipment is designed to protect personnel across a number of unique and hazardous work environments including fire and rescue services, petroleum, chemical, construction, industrial and emergency services, including first responders, law enforcement, military and civil defence operations.

The product range includes self-contained breathing apparatus, supplied air and air-purifying respirators, gas detection instruments, thermal imaging cameras, air compressors and accountability systems, as well as head, eye, face and hearing protection.

Scott Safety products protect thousands of workers from the hazards they face – smoke and toxic fumes, combustible gases, falling objects, fire & flame, contaminants and more.

To ensure these products continue to provide the protection your personnel rely on every day, Scott Safety operates dedicated service facilities in NSW, QLD and WA that offer calibration, repair and maintenance of Scott Safety gas detection products, full service capabilities across our SCBA (Self Contained Breathing Apparatus), PAPR (Powered Air Purifying Respirators) and full face respirator range as well as repair services for Scott Safety Thermal Imaging Cameras. The Sydney NSW service centre also incorporates an RAN certified hyperbaric facility and positive pressure full-face respirator test and reporting capability.

For more information, go to
www.scottsafety.com

Bushfire Defence

Booth 189

Bushfire Defence in combination with Bulbeck Fire Industries proudly announce the launch of the BUSHFIRE DEFENCE Pre-Engineered, Crew Protection System designed for lightweight quick response vehicles. Utilizing components which are Active fire listed and designed in accordance with AS 5062-2006 Fire Protection for Mobile and Transportable Equipment. The BUSHFIRE DEFENCE Crew Protection System is designed to provide protection to the external cabin of the vehicle by applying a layer of liquid gel which acts as a thermal insulating barrier thereby reducing the radiant heat and risk to occupants.

Bushfire Defence provide comprehensive personal and asset fire safety solutions for businesses and residents throughout Australasia. Our unique combination of products and services allow our clients to create customised and economical solutions designed to help protect their buildings, equipment and their most valuable asset; their people.

The Bulbeck Group is a wholly owned and operated Company since 1949 and entered the Fire Protection industry in 1991. Bulbeck Fire Industries (BFI) was established as the Company's fire protection equipment manufacturing and product distribution division in 1995. Over the last 17 plus years, BFI and the BFI brand, has become widely recognized as a market leader in fire protection equipment innovation and product supply. Where safety is paramount you can rely on our tried and tested product range. From quotation through to design and final commissioning your project is in experienced hands.

For more information, go to
www.bushfiredefence.com.au

EMSINA

Booth 17-19

Like a demonstration on the latest technologies in mapping used across the emergency services sector in Australia?

Do you have a smart phone, iPAD or tablet PC and need to know what 'apps' to install for use in emergencies? Do you know what mapping services are provided for within your agency?

EMSINA members will be on hand in the 'EMSINA Spatial Play Pen' in the AFAC 2015 Trade Exhibition Hall to walk you through the latest in mapping technologies for emergency management. We would like to assist those just starting to navigate the mobile maze who need help with which apps to choose for their smart device such as iPhones, iPAD's and Android tablets, as well as those interested in what other emergency teams are using - come and see us!

The Emergency Management Spatial Information Network Australia (EMSINA) is now in its 6th year in partnership with the annual AFAC conference in promoting mapping and spatial technologies as an aid to decision making for emergency services workers. In 2015, EMSINA is doing this in two ways: 1) through our booth the 'EMSINA Spatial Play Pen' within the Trade Exhibition Hall, and 2) via our hosting of the post conference professional development workshop 'Mapping and Location technologies – are you up to speed with all the possibilities'.

EMSINA is a vibrant and active group of practitioners in the emergency management sector committed to improving the safety for Australians through the use of sound decision making, supported by spatial information technologies. EMSINA was formed in Canberra on 11 October 2002 and consists of mapping practitioners from all state and territory emergency agencies, as well as Federal Government departments such as Emergency Management Australia, Geoscience Australia, Department of Defence, and the Bureau of Meteorology.

Drop in to see the EMSINA members in the trade Exhibition Hall and watch the hands on demonstrations of the latest technologies in desktop solutions and mobile apps used by emergency organisations across Australia for mapping.

For more information, go to
www.emsina.org

sicor-sureco.com

When comes the time for facing situations of extreme danger, for protecting your companions and saving the lives of others, the only thing that matters is to do so without worrying about yourself.
Every day, all you have to do is make the right choice, is choose the right partner to watch your back.

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Helmet EOM

EN 16471:2014
For wildland fire fighting
EN 16473:2014
For technical rescue
EN 12492:2012
For mountaineers

Helmet VFR EVO

EN 16471:2014
For wildland fire fighting
EN 16473:2014
For technical rescue
EN 443:2008
For fire fighting in buildings
and other structures

For 30 years Sicor has been developing, manufacturing, and supplying
the best helmets for the protection of many prestigious Fire Brigades in the world.

Taking Photos on an Australian Fire Ground

Firefighters are called to deal with fires and accidents. To the firefighters these may be challenging but rewarding tasks, to the people involved they may be the worst event in their life. Recording the action may be useful for training, post event reviews or as a record of personal achievement but its broader distribution on social networks may be traumatic for those involved.

Dr Michael Eburn

Michael Eburn is an Associate Professor at the ANU College of Law and the author of Emergency Law (Federation Press) and the online blog – Australian Emergency law. He is the chief investigator on the Bushfire and Natural Hazards CRC research project: Policies, institutions and governance of natural hazards.

The issue of using high quality cameras, including those found on mobile phones, raises legal questions of when can they be used and for what purpose. This brief review will outline the law in Australia.

Who owns the photo?

The ownership of artistic work, such as a photograph, is governed by the *Copyright Act 1968* (Cth). A valid Commonwealth law prevails over an inconsistent state law (Australian Constitution s 109). The *Copyright Act 1968* (Cth) s 35(1) says that a person who creates an ‘artistic work’, such as a photo, owns it. The relevant exceptions to this rule is that if the photographer produces the work as part of their employment then it is their employer owns the photo (s 35(6)). Further where the material, in this case a photo, is created or published under the ‘direction or control’ of a State or the Commonwealth government, then the intellectual property belongs to that government (ss 176-178). The Australian fire services, such as the New South Wales RFS and the South Australian CFS are part of the state government so it is the State that will own the copyright where photos created or published under the services’ ‘direction or control’.

Image courtesy of VMRC

In *Copyright Agency Limited v State of New South Wales* [2007] FCAFC 80 Finkelstein J said:

> … where the Crown has power to require a work to come into existence, the work is made under the "direction" of the Crown. If the Crown has dominion over the execution of the work then it is made under its "control". The assumption that underlies each concept (direction and control) is the existence of a relationship between the Crown and the author that authorises the Crown to give the direction or exercise the control as the case may be.

If a fire fighter is asked to take a photo of something for use by the fire service, for example if it is observed that there is something that may help identify the cause of the fire or be useful for training and a senior officer, seeing that a firefighter has a camera says 'take a photo of that, we'll have a look at that in more detail later', that would be taking the photo at the 'direction' of the Crown.

Control is more problematic. Members are subject to the control of the fire service for which they work or volunteer. It is the fire service that provides training and directs how tasks are to be undertaken; but if they stop and take a photo along the way are they taking the photo under the 'control' of the fire service? A fire service may well control, that is give instructions on how various fire fighting tasks are to be performed, but they are unlikely to give instructions on how to take photos.

The reality is that fire fighters will want to take photos of the scene, their colleagues, and the fire truck to record their memories and that they were there. To suggest that a fire service owns all the photos on a fire fighter's smart phone is a step too far. If the service did own the photos they could insist that firefighters hand over the photos which the service could then use however it saw fit (subject to the obligation to acknowledge the photographer – *Copyright Act 1968* (Cth) Part IX, Moral Rights). The fire service may have a legitimate desire to limit the use of the photos does not equate to ownership.

In short unless a photo is taken as part of the photographer's employment of if, as a volunteer they have been instructed to take the photo for the purposes of the fire service, then it is the photographer and not the service that owns the photo.

Is there anything you can't photograph?

In Victoria Park Racing and Recreation Grounds Co Ltd v Taylor (1937) 58 CLR 479, Taylor built a tower on his property so he could see over the fence into the race course run by Victoria Park Racing and Recreation Grounds. A person stood on the tower and reported on the races to Sydney radio station 2UW. The plaintiff race-course owner wanted an order to stop the practice in order to encourage people to come to, and pay to enter, the race course. In the High Court of Australia, Latham CJ said 'I am unable to see that any right of the plaintiff has been violated or any wrong done to him. Any person is entitled to look over the plaintiff's fences and to see what goes on in the plaintiff's land'.

The shorthand from that case is that 'there is no property in a spectacle'; if you can see it you can report it or photograph it (subject to any express law to the contrary). This principle caused one television channel problems when they sought the exclusive rights to broadcast the 1999 Sydney News Year Eve Fireworks *(Nine Network Australia Pty Ltd v Australian Broadcasting Corp* [1999] FCA 1864). Despite having paid for the 'rights' the Nine Network could not stop the ABC recording and broadcasting images of the fireworks that were there for all to see.

It follows that a fire fighter can photograph that which they can see, just like anyone else; but it can become problematic if the only reason that the fire fighter can access the area is because he or she is a fire fighter. Generally there is no right to privacy and no tort of 'breach of privacy' but there are state and federal privacy laws. These laws relate to government agencies and how they collect, store and use private data (see *Privacy and Personal Information Protection Act 1988* (NSW) and *Privacy Act 1988* (Cth)). A fire fighter that takes a photo that reveals personal information, and who is in a position to get that photo only because of their role as a fire fighter, then it may be argued that the information recorded on the photo has been collected by a 'public sector agency' in which case the relevant privacy laws would apply. These laws would impact on how the information can be used, stored etc.

Service policy

The legal conclusions are not the end of the matter. The next thing to consider is does the fire service have a photo or social media policy. The fire service may not own the photo but members of the service agree to be bound by its rules and to be part of the organisation when they join the service, whether as a volunteer or employee. If taking, or more importantly, using the photo is contrary to service policy, the member could expect to face disciplinary action which could, in extreme cases, include exclusion from the service (see for example *Fire and Emergency Services Act 2005* (SA) s 70 and *Fire and Emergency Services Regulations 2005* (SA) reg 22).

Conclusion

As was noted at the start of this paper, the use of modern high quality, small cameras by fire fighters and other emergency service personnel raises complex legal questions. This brief review has concluded that fire fighters, like anyone, can take photos of what they can see from a public space. Where they can only access the area because they are fire fighters, the relevant state and federal privacy laws may affect the use that can be made of those photos. A claim that any photo taken by a member of a fire service belongs to that fire service, does not reflect the law. The service will only own the fire if the photographer takes the photo as part of their employment or at the direction or control of the fire service.

For more information, go to www.emergencylaw.wordpress.com

References

This article is based on opinion pieces that appeared on my blog, Australian Emergency Law (https://emergencylaw.wordpress.com/); in particular 'Taking photos on the fireground in South Australia' (January 9, 2015) and 'Taking photos whilst on duty with the NSW RFS – amended' (October 26, 2013).

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A Common Operating Picture for Fire Response

Keeping citizens and properties safe – the call of every fire and rescue organisation. The nature of emergencies is as varied as the people who call for help. Communities rely on public safety personnel being prepared and capable to respond, whatever the circumstances and wherever the need.

Mike Creevey

A geographically-enabled computer-aided dispatch (CAD) system can play a major role in this. CAD systems initiate calls for service, dispatch units and manage resources in the field. In addition to incident information, CAD systems feature comprehensive map data – down to the street and building level, including aerial images.

In CAD, when disparate data from numerous sources are integrated and placed in a visual context they provide fire and rescue agencies with a clear common operating picture. From this viewpoint, incidents are better managed and the right choices are made to protect lives and properties.

The Power of Location

New Zealand adopted new, geospatially enabled CAD software for its national public safety agencies in the 1990s. The single, national system has proven to be invaluable in emergency readiness, planning and response management, especially when disasters hit.

A major 7.1 magnitude earthquake struck Christchurch, New Zealand's second largest city, and its surrounding districts in September 2010. Despite facing the worst natural disaster in 20 years, New Zealand Fire Service (NZFS) responded decisively without delay to save lives. Working to contain the widespread fires caused by the

Image courtesy of Intergraph

Mike Creevey is Vice President of Sales for Intergraph – Asia Pacific.

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earthquake, NZFS officially responded to more than 1,100 incidents in the first four days and many more in the following weeks.

The CAD system withstood the earthquake to deliver smooth and swift dispatch operations demanded in the calamity. The solution was designed specifically to handle call-taking and dispatching for multiple public safety agencies with thousands of vehicles spread over a large geographic area.

The high interoperability of the software ensured police, fire and ambulance services could access one another's information easily – verifying incidents, locations and other important data. With this capability, the agencies were able to quickly establish a comprehensive view of what was happening.

"Interoperability of the CAD system ensured that all responding agencies could see a common operating picture so that we could deploy emergency crews accordingly," Ian Pickard, assistant national commander of NZFS, said at the time.

A useful feature of the CAD is its scalability. Under normal operating conditions, each agency views event data, call-outs and emergency vehicle movements only for their region. In times of crisis, the CAD coverage can be zoomed out to a nation-wide view or zoomed in to a single focus area. Therefore, situational visibility was increased considerably during the earthquake response and resources were managed efficiently.

Through the CAD system, NZFS took full advantage of location-based incident management, pinpointing exact locations and understanding conditions reliably in real time. Every detail of each incident was incorporated and presented clearly. As a result, rescue services to the public were expedited with the nearest and most appropriate emergency crew efficiently deployed to the scene.

Using a suite of tools and data sources, including the CAD system, NZFS provided operational data to the New Zealand Ministry of Civil Defence and Emergency Management (MCDEM), the lead coordinating agency. The data used ultimately helped to coordinate the nation-wide relief efforts and raise the overall response level needed during this catastrophe.

"Our command structure, support systems, equipment, training, professionalism, teamwork and our desire to help, all meshed together to provide the police and fire with a first class response," Pickard said.

Aided by the powerful CAD software solution, the operation moved quickly from response to recovery, and it was almost business as usual within a fortnight of the earthquake.

The Power of Coordination

An intelligent CAD systems' ability to coordinate multiple agencies is built on interfacing between various response systems to meet the high demand for accurate, reliable and faster routing and dispatch. One such CAD system used successfully to integrate response technologies is that of Edmonton Fire Rescue Services (EFRS)

The City of Edmonton, Canada, is working to achieve tighter integration and optimised workflows among public

> **A useful feature of the CAD is its scalability. Under normal operating conditions, each agency views event data, call-outs and emergency vehicle movements only for their region. In times of crisis, the CAD coverage can be zoomed out to a nation-wide view.**

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safety and health organisations as part of its significant "One City" initiative. EFRS recognises the benefits CAD delivers to overall safety and productivity when critical information and insights are shared with neighbouring agencies, public safety partners and third-party entities.

The high interoperability of its CAD solution allows EFRS to share data with Alberta Health Services (AHS), the province-wide medical services agency, enabling electronic dispatch notifications between the two organizations. The EFRS system automatically notifies AHS when a fire event requires emergency medical support. Likewise, AHS's CAD system notifies EFRS when a medical event requires fire agency assistance.

Additionally, the CAD system features a "Quick Accept" capability for emergency calls. This enables EFRS to dispatch units to the scene when the agent is still on the call, taking information and feeding it to the field units using mobile technology.

With mobile software, dispatch teams can also share pre-incident planning information such as road closures and out-of-service hydrants. This information is placed in the CAD common map so EFRS response teams arrive on the scene faster and, can receive and update emergency events on-scene, in-vehicle. The system is bringing EFRS closer to its goal of being on-scene within four minutes of a fire truck leaving the station.

"The Quick Accept process alone has already shortened EFRS response times by at least 30 seconds," said Edmonton Deputy Fire Chief Graeme Hubbick.

The Power of Innovation

Building on the foundation provided by a powerful CAD system, agencies can innovate to improve response. Victoria, Australia, is leading the way in emergency management with a new mobile command center.

After experiencing several natural disasters such as floods and wildfires, the government of Victoria knew it needed to overcome interoperability issues to overhaul its emergency response capabilities. A prototype command center called the Emergency Services Integrated Communications (ESIC) vehicle was designed to serve these purposes.

Built by Australia's National Safety Agency (NSA), the first-of-its-kind vehicle in Australia is deployed to reach rescue sites where power and telecommunications infrastructure are virtually absent, cut off or over loaded. Equipped with real-time planning and response software, the incident command and control system can be sent to emergency sites to coordinate rapid response by first responders on the field, and particularly, among various public safety agencies during disasters.

The self-sufficient ESIC vehicle boosts more than 30 screens providing comprehensive intelligence and emergency management capabilities. Operators can view multiple perspectives such as locations, weather, hydrology data, 3D disaster simulations, camera feeds, real-time images, relevant social media feeds and dashboards.

There are also multi-media and video conferencing facilities connecting between the vehicle and the State Control Centre. Diesel power, radio telecommunications, wireless and satellite connectivity and other useful capabilities are also packed into the 14.8 metres trailer.

"The aim of this vehicle is to go to an area where we can provide literally all our own communications whether it's for emergency services or members of the public," said Des Bahr, chair of the NSA. More trucks are planned to roll out in the future to better serve the communities.

Conclusion

An intelligent CAD solution gives fire and rescue personnel an unparalleled level of communication and control. With a common operating picture that connects responders with the critical information they need to save lives, this technology is fundamental to any fire and rescue operation. In today's trying economic times, when return on investment is always in question, an organisation's investment in CAD software is an investment in its future, and in the citizens and communities it serves.

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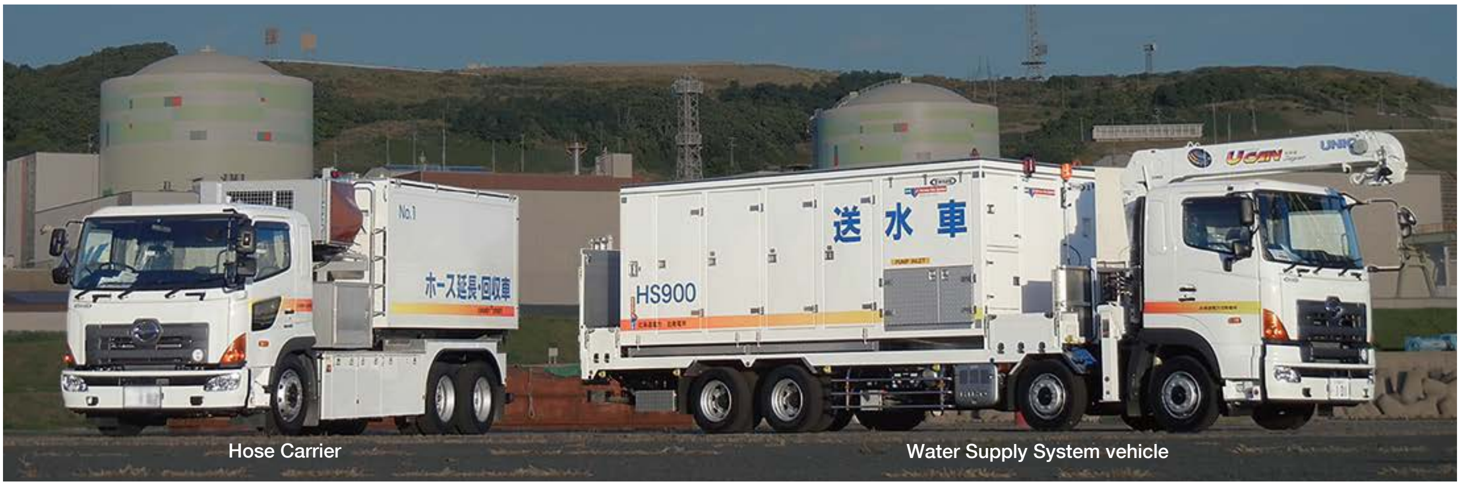

The Long Distance Large Volume Water Supply System vehicles (Hydrosub System vehicles) can supply water at up to 30,000L/ min. over long distances for fire extinguishing in the event of disasters, oil tank fires or forest fires and can also be used for emergency cooling of nuclear power plants.

The Long Distance Large Volume Water Supply System vehicle and Hose Carrier further meet the following terrorism and severe accident measures in the current nuclear regulations set by Japan's Nuclear Regulation Authority (NRA)

■Cases corresponding to prevention of nuclear disasters:

- ●Response to intentional aircraft crashes
- ●Suppression of radioactive material dispersal
- ●Prevention of Containment Vessel failure & large release
- ●Prevention of core damage (Postulate multiple failures)

Over 80 sets of these products have been supplied to nuclear power plants.

■Water Supply System vehicle

Hydrosub Model		＊HS150	HS550(F)	HS900(F)	HS1200(F)
Water volume	L/min.	3,000	14,000	20,000	30,000
Water release pressure	MPa	1.2	1.2	1.2	1.2
Water intake depth	M	60	15	15	15
Vehicle dimensions	M(L×W×H)	8.0×2.5×3.5	12.0×2.5×3.5	12.0×2.5×3.5	12.0×2.5×3.5
Vehicle weight	Kg	15,000	22,000	24,000	25,000

● (F) includes foam mixer (option)　＊HS150 is a container model.

■Hose Carrier (with detachable hose container)

Hose Recovery Unit Model		HRU200 (for 150 ～ 200MM hose diameters)	HRU300 (for 250 ～ 300MM hose diameters)
Hose load	M	1,000 ～ 1,800M	400 ～ 600M
Vehicle dimensions	M(L×W×H)	7.8×2.5×3.8	8.4×2.5×3.3
Vehicle weight (hose not included)	Kg	12,100	14,300

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Petroleum Storage Tank Facilities – Part 1

In today's fire service we tend to focus our pre-planning and training for the "bread and butter" operations that we encounter daily.

Craig H. Shelley
FIFireE, CFPS, Retired Chief

Craig is a 45-year veteran of the fire service. He served with the FDNY for 26 years retiring as the Chief of Marine Operations. Currently, Craig is an Assistant Chief with Industrial Emergency Services (IES) and Manager of Marine Operations. In addition, he is the CEO of World Safe International.

Sue Tarantino
BS, MBA, Retired Battalion Chief

Sue is a retired 27-year veteran of the Charlotte (NC) Fire Department. She is currently a Division Chief with Industrial Emergency Services (IES) and Assistant Manager of Marine Operations. She also serves as a senior fire protection specialist with World Safe International.

These 'bread and butter' operations are generally single and double residential structure fires, multiple family structure fires, hi-rise commercial and office fires, and assorted emergencies that we encounter frequently. We are creatures of habit and feel most comfortable with what we respond to most frequently. While these incidents are usually high frequency/low to medium risk incidents, this tends to be our focus. We are sure that most jurisdictions have industrial and commercial facilities that the firefighters pass frequently without giving them a passing glance. It is fires and emergencies at these facilities that we classify as low frequency/high risk events.

One type of facility that we would like to focus on in this series of articles is the petroleum storage tank facility. We rarely hear of a storage tank fire today, because the industry has improved on the design, construction, and fire protection requirements for these facilities. It is interesting to note that over the years the number of fires in storage tank facilities has decreased, but the actual tank sizes have increased. The larger tank sizes actually increase the hazard. A fire in these larger tanks can be extremely disruptive to business continuity, costly in terms of property damage, create environmental issues, affect interstate commerce and create negative public opinion. When a storage tank fire involves the full surface of the product contained within the tank (hereafter called 'full surface fire'), it will require a large commitment of resources, both equipment and human, and will require an extensive logistics structure. On a positive note, the improvements to the various codes and standards developed and maintained by the American Petroleum Institute (API) and the National Fire Protection Association (NFPA), along with proper enforcement of these standards and codes by the authorities having jurisdiction, have reduced these incidents to the lowest levels in decades.

The above mentioned bulk storage tank facilities can be located almost anywhere, from large refinery and petrochemical plants to smaller bulk storage plants with loading terminals. In between we may have large marine terminals and smaller ethanol refining facilities. In this series of articles we will focus on the types of storage tanks, fire suppression systems, firefighting operations, and pre-incident response planning.

Types of Storage Tanks

In this article we will focus on above ground atmospheric petroleum storage tanks. These tanks range from diameters of 3.048 meters (10 feet) to over 106.68 meters (350 feet). In some instances, there are tanks exceeding 121.92 meters (400 feet). Average heights for above-ground tanks are 13.72 meters (45 feet). Tanks may be in individual dike areas or may have multiple tanks within one dike. Dikes, or bunds as they are also referred to are physical barriers or dividers used to prevent the spread of tank contents in the event of a tank overflow or tank rupture.

There are several types of above ground atmospheric storage tanks. For this article we concentrate on the following types, typically found at bulk storage facilities:

- Cone roof and dome roof tanks
- Open top floating roof tanks
- Covered floating roof tanks including geodesic domes
- Vertical low-pressure storage tanks
- Horizontal Storage Tanks

The types of tanks used to store flammable and combustible products are generally determined by the physical characteristics of the product being stored, however, this may not always be the case. There have been instances where products have been stored in tanks not intended for the particular product.

Cone or Dome Roof Tanks

Cone roof and dome roof tanks are similar with the difference being the shape of the roof. Cone roofs have a cone shape, but depending on the slope of the roof, the cone shape may not be evident from the ground. These tanks will have a vapor space between the product surface and the underside of the roof. If this vapor space is in the explosive range and an ignition source is introduced, an explosion will occur. Generally, these tanks are used to store liquids with a flashpoint of 37.8 degrees C (100 degrees F) or higher, however, there have been instances where liquids with lower flashpoints have been stored in such tanks and the vapor space has ignited.

These tanks are equipped with a pressure/vacuum relief device to allow the internal pressure to nearly equal the external atmospheric pressure. They may also have open vents. These devices allow the tank to "breathe" during loading, unloading, and extreme changes in temperature resulting in a change of the pressure in the vapor space. Cone and dome roof tanks will also have a weak roof-to-shell seam. In the event of an incident such as internal overpressure from an explosion or similar incident, the roof will separate from the vertical shell, thus preventing the failure of the bottom seams and a resultant tank rocketing event. Flame arrestors may also be found to prevent the introduction of a spark to the vapor space through vents or pressure/vacuum relief devices.

Open Top (External) Floating Roof Tanks

Open top floating roof tanks are vertical steel cylinders with a roof that floats on the surface of the liquid in the tank but it is open to the atmosphere above. The roof moves up and down inside the tank shell with the product. This floating roof's advantage is that there is no vapor space between the liquid and the roof as in a cone roof tank. These roofs float on pontoons or have a double-deck for floatation on the liquid's surface.

These tanks can be distinguished from a cone roof tank by the presence of a wind girder that rings the top of the tank. The wind girder acts as a stiffening ring for the top of the tank, giving it additional structural support. Between the shell of the tank and the roof edge, a rim seal will be provided to prevent vapors from escaping to the outer air. The rim seal area is considered to be the space between the tank shell wall and the floating roof edge. This distance may be 0.30 meters to 1.21 meters (1 foot to 4 feet). Open top floating roofs generally carry low flash point liquids which have high vapor pressures.

While the roofs of these tanks are designed for carrying a specific live load plus additional loads created by rain and snow, they can fail if the load exceeds the designed limits. To prevent the excessive load, the roofs are designed with a drainage system to remove normal rain water from the roof to the ground where it can be collected inside the dike area. In the event the drain system fails, or is overwhelmed by severe weather, the load can partially or fully sink the roof. When this happens the product is exposed to the atmosphere and vapors are released, subjecting them to possible ignition.

Covered (Internal) Floating Roof Tanks

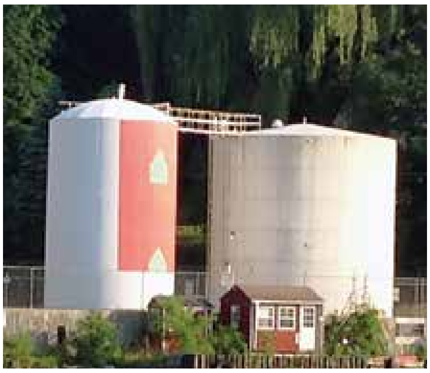
These tanks exhibit the same basic construction features as the open top floating roof tanks but with the added feature of a fixed roof at the top of the tank. The fixed roof may be self supporting or may have vertical supports within the tank. These tanks also have a rim seal to prevent the escape of vapors from the liquid. The fixed roofs of these tanks are freely vented with the expectation that any vapors in the space above the floating roof will be below the flammable limit.

Covered floating roof tanks have distinguishing "eyebrow" vents at the top of the tank shell. These vents allow air to escape and enter the inside space between the fixed roof and the internal floating roof as it moves up and down inside the tank shell.

Domed External Floating Roofs

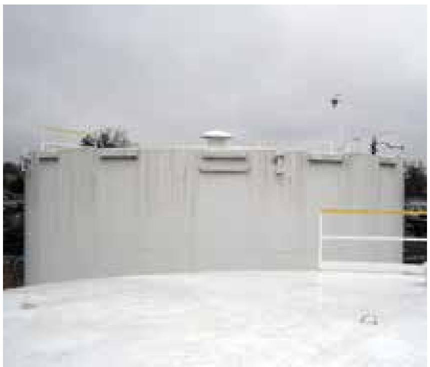
Domed external floating roof tanks are similar to covered floating roof tanks but instead of a steel roof, a much lighter roof structure is installed on an existing open top floating roof tank. These roofs are often referred to as geodesic dome tanks. The dome serves to provide a barrier to the wind and rain and may also provide environmental control with respect to fugitive emissions.

▼ Cone Roof Tanks – note the difference in roof shapes.



▼ Open Top Floating Roof Tank – note the presence of the wind girder just under the open top.

▼ Covered Floating Roof Tank – note the 'eyebrow' vents near the tank top.



Images courtesy of Craig H. Shelley

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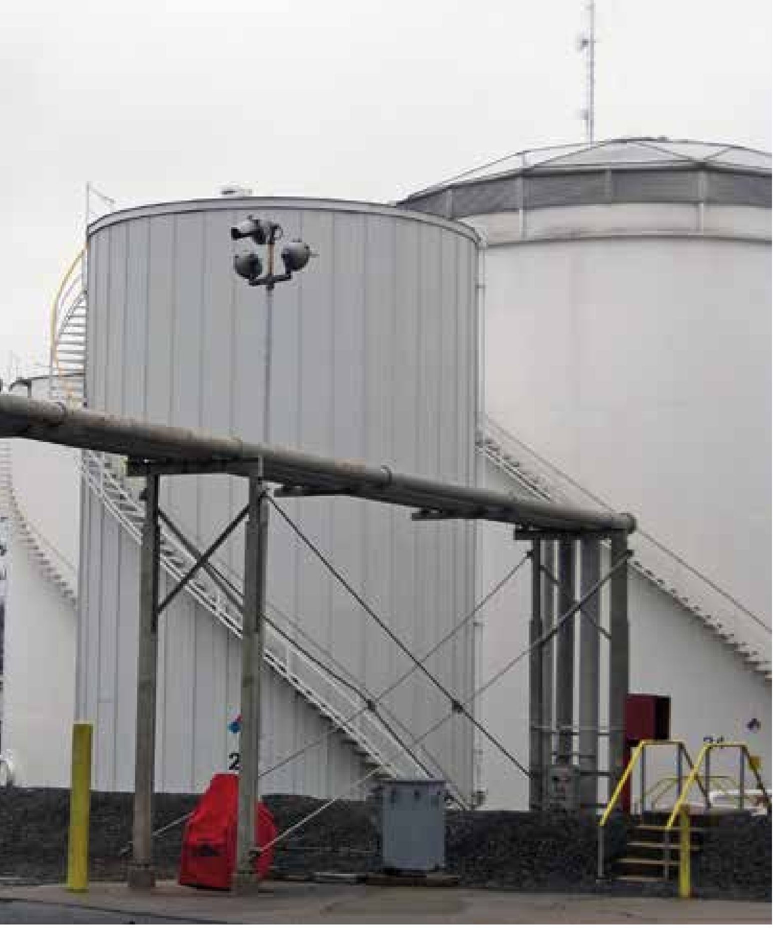

Image courtesy of Craig H. Shelley

◀ Domed External Floating Roof Tank next to Vertical Low Pressure Tank.

Vertical Low Pressure Storage Tanks

These tanks have relatively simple features. They are cylindrically shaped with a top and bottom. They will have some form of pressure/vacuum device. These tanks are generally smaller than cone roof tanks and generally used in process areas or specialty storage areas.

Horizontal Storage Tanks

Above ground horizontal storage tanks are normally smaller capacities, 151,400 liters (40,000 gallons) or less and are used primarily for storing flammable and combustible liquids.

Locations of Storage Tanks

The above-mentioned storage tanks can be found at many locations within fire districts. Locations that are most common are refineries, petro-chemical facilities, bulk storage plants, airports and marine terminals. This list is not all inclusive and many smaller facilities may have storage of flammable and combustible liquids. This series of articles focuses on larger facilities where the number and spacing of tanks, or the volume of the tanks creates a severe fire hazard.

Too many times these facilities with their tanks become just “part of the landscape” within our districts. As mentioned previously the fire service tends to focus on our bread and

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butter operations, and ignore the low frequency events. It is imperative that we notice these facilities, pre-plan them, and learn as much as we can about the facility, product, processes, and the fire protection or lack thereof in a facility.

Fire Hazards

The following are some of the hazards associated with the various types of storage tanks:

Fixed (Cone Roof) Tanks

- Vent fire
- Overfill ground fire
- Unobstructed/obstructed full surface fire

Open Floating Roof Tanks

- Rim seal fire
- Overfill ground fire
- Unobstructed/obstructed full surface fire

Internal (Covered) Floating Roof Tanks

- Vent fire
- Overfill ground fire
- Obstructed rim seal fire
- Obstructed full surface fire

Domed External Floating Roof Tanks

- Vent fire
- Overfill ground fire
- Obstructed rim seal fire
- Obstructed full surface fire

Vertical Low Pressure Tanks

- Vent fire
- Overfill ground fire
- Obstructed full surface
- Tank explosion and failure preceded by ground fire
- Tank explosion and failure with resulting ground fire

Horizontal Tanks

- Vent fire
- Overfill ground fire
- Tank explosion and failure preceded by ground fire
- Tank explosion and failure with resulting ground fire

The above listings may occur alone or in combination with each other. For instance, you may have a full surface fire in a tank and at the same time have a ground fire in the dike area. Our next article will focus on the types of fires in depth and the fire protection methods available followed by a third article which will give firefighting strategies and tactics as well as pre-incident planning guidelines.

For more information, go to
www.worldsafeinternational.com

Resources

American Petroleum Institute [API]. API Recommended Practice 2021: *Management of Atmospheric Storage Tank Fires.* Washington, DC: API, 2001, Reaffirmed 2006

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New Zealand USAR advances their Technology Capability

The USAR capability in New Zealand falls on the shoulders of the New Zealand Fire Service. Their taskforce has a pool of 210 people sourced primarily from NZFS personnel both career and volunteers. The early days of USAR back in the 1990's was a very different picture from what it is today.

Gavin Travers

Gavin Travers is the National Operations Advisor (USAR) this role includes being the National USAR Manager based at National Headquarters in Wellington. He is a 32 year veteran firefighter and has progressed through the ranks to Area Commander.

Urban search and rescue was created by a small group of enthusiastic people who had the foresight of a USAR capability in NZ. They begged, stole and borrowed equipment including personal protective clothing to form the capability they strongly believed was needed for NZ.

On the 8th March 2015 New Zealand USAR underwent their INSARAG external classification in a bid to be classified as a "Heavy" team. They successfully achieved this after two and a half years of preparation and a significant financial cost and resource commitment. The Taskforce now known as NZL 1 were thrilled to receive 129 green and 7 yellow lights. The build up was run with three work-streams running simultaneously and their associated project plans and cost allocations.

USAR Management Team – A new structure was introduced to provide a connection between the management of the team and the team members. The CAT3 component is all NZFS commanders who bring to the USAR command function a long a distinguished incident command level of experience. They lead the functional work-streams to provide governance and enabling to those work-streams.

Functional Work-streams – Membership is encouraged from each of the three geographically located teams. The work-stream provides a National and therefore consistent direction for the various functions within USAR. Equipment purchasing had been a problem area for us prior to the establishment of the work-streams.

After the Christchurch earthquake

Image courtesy of NZ Fire Service

in Feb 2011 several independent reviews made recommendations for a new management structure. This also involved the introduction of the NZFS ranks into the USAR organisation structure. A National USAR Manager was appointed to provide direction domestically, engage with other domestic emergency response partners and to promote NZ USAR at a political and international level.

Information & Communications technologies are a rapidly changing environment and NZ USAR wanted to ensure they not only introduced a new electronic method of data collection and in a collaborative space to share that data but developed this on a platform the rest of the NZFS could consume.

The result was the following...

In 2014, the NZ Fire Service established a technology solution to support Rapid Disaster Assessment by the NZ Urban Search and Rescue (USAR) task force, also supporting NZ USAR External Classification as an International USAR Task Force [Heavy] under the United Nations International Search and Rescue Advisory Group (INSARAG) framework in March 2015. The solution is built on the NZFS ESRI enterprise technology platform and supports NZ USAR Domestic and International deployments effectively through incident ground data collection and resource tracking (using tablets and ESRI Collector for ArcGIS software), real-time situation awareness in the USAR Base of Operations and Coordination Centres to support Incident Controller and Task Force leader decisions (using ESRI Operations Dashboard software), and provision of near real-time intelligence to other agencies globally through Cloud-based data storage and delivery (ESRI ArcGIS Online). The solution meets the operational protocols, forms and workflows defined by the United Nations and INSARAG and are also being deployed to Civil Defence and Emergency Management groups throughout New Zealand to support the Ministry of Civil Defence & Emergency Management (MCDEM) requirements for a Rapid Impact Assessment solution.

The practicalities of this is a Samsung Galaxy Note 10.4 tablet with 3G and Wifi options for connection directly with the cloud or with a another new ICT component also developed by NZ USAR. The deployment case boosts the following features;

Images courtesy of NZ Fire Service

- 4 x Bearer source, BGAN, Wireless, WAN, 4G
- USB 2.0 and 3.0 ports
- 6 Port Ethernet with POE
- 2 x 1GB HDD in raid configuration
- 1 x USB External HDD for backup
- OS Windows server 2012
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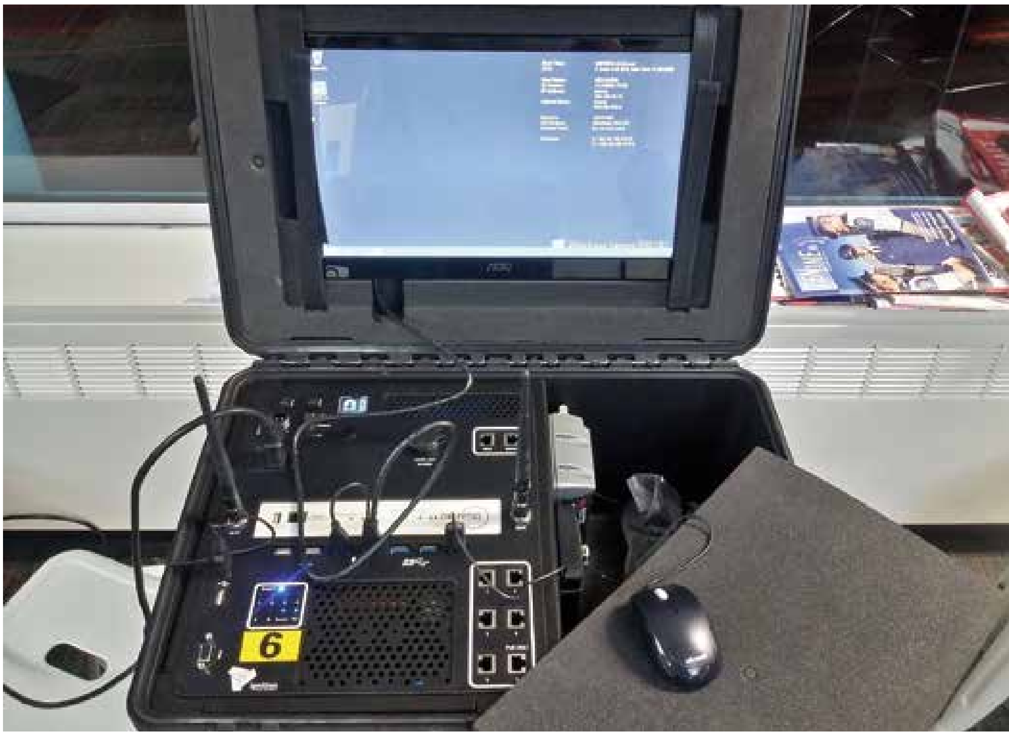

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This 256-page training book, written by Holmatro Rescue Consultant Ian Dunbar, promotes a safe, methodical and casualty centered approach to vehicle extrication. Not only does it cover rescue tools and techniques, it also highlights key medical considerations and guides the rescuer through the process of efficient planning. All techniques described in the book have QR codes referring to videos showing how to perform these procedures.

App and posters
The book is part of the new Vehicle Extrication Techniques series, which also includes an app (iPad and Android tablet) and a poster series. All items will be available in multiple languages.

Watch the trailer now! Go to holmatro.com/en/vet or scan the QR code.
For sale at your local dealer: **www.holmatro.com**

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Urban Search and Rescue Innovations

Urban Search and Rescue (USAR) is one of those areas where every little bit of an edge counts in saving life, the rescue industry is well aware of this and is continuing to innovate with the resultant outcome of more lives saved. Here are some of those innovations.

Savatech d.o.o.

Savatech d.o.o., Environmental protection program manufactures a wide range of inflatable products for different niches:

- Water and waste water treatment – pneumatic plugs for blocking and testing of tightness of sewer and water pipes, pneumatic packers for rehabilitation.
- Rescue niche – fire and rescue equipment – high and low pressure lifting bags, stretcher, walkway.
- Hazmat niche – decontamination units, leak sealing equipment and different types of storage rubber and PVC tanks.
- Off shore – oil booms.
- Hydrogeological investigations – high pressure packers.

Savatech d.o.o. also manufactures products used with different USAR teams. Among the most interesting products are high pressure bags. High-pressure lifting bags are used for lifting the heaviest loads, they exert maximum force in a concentrated area, making them ideal when lifting rigid structures in tight places. Their unique structure also allows use in load shifting, heavy truck or aircraft recovery and different moving situations.

Environmental protection products program exports to more than 80 countries worldwide and is ranked among top manufacturers in the world based on quality, sales and technical service provided.

For more information, go to www.savatech.com

Pelican Products

Pelican Products, the global leader in the design and manufacture of high-impact protective case solutions and advanced portable lighting systems, has introduced the compact and lightweight Pelican ProGear™ 3310PL LED flashlight.

The Pelican ProGear™ 3310PL LED flashlight is made of virtually indestructible polymer material with a photoluminescent finish that gathers ambient light to glow in the dark when the light is off, making it easy to locate in blackout situations.

The shape of the light's body is engineered to fit perfectly in the natural grasp of gloved hands and the ridges along the handle allow for a strict non-slip grip. A security wrist lanyard is attached to avoid losing the Pelican ProGear™ 3310PL LED flashlight in risky situations. Its IPX7 ingress protection rating assures reliability in the soggiest environments. It also has a length of 6.14 inches and a lightweight feel at only 6.2 ounces. The Pelican ProGear™ 3310PL LED flashlight also features a castle-top to alert the user when it's turned on and left in an upright position.

Requiring only 3 AA batteries (included), the flashlight offers three modes high: (234 lumens), low (28 lumens) and flashing, with a runtime of up to 8 hours and 45 minutes in high mode. The Pelican ProGear™ 3310PL LED flashlight leads the way with a beam distance of 240 meters and a peak beam intensity of 14,500 candelas. Backed by Pelican Products' Legendary Lifetime Guarantee of Excellence the Pelican ProGear™ 3310PL is available for purchase through any of Pelican's authorized resellers.

For more information, go to www.pelican.com

Savox

Savox equipment has been used for more than 15 years by USAR teams around the world; its search cameras, such as the latest Searchcam SC3000, and the Delsar LD3 seismic/ acoustic listening device, are in regular use by a large number of agencies. Over the years, the company has gathered valuable user feedback leading to improvements in both its USAR products and the procedures recommended for their use. The development of RescueCom arose when Savox saw the need for a piece of kit that would enable victim-location-equipment operators to communicate more effectively than just shouting. Together with the USAR user feedback the company brought its expertise in communications to bear to develop RescueCom, which now provides a totally new use case for USAR teams, combining traditional SAR equipment, such as Searchcam SC3000 and Delsar LD3, or other 3rd-party life-detection equipment, (RescueCom is technology independent), with a new method of communications amongst team members using two-way radio (preferred), mobile phones, smart phones, or tablets working through the system. RescueCom can be used with breathing apparatus if a respirator communications option is chosen, which makes it ideal for use by fire and rescue departments.

The new RescueCom product has been explained to existing SearchCam3000 customers, who have unanimously stated interest; some explained to Savox that it would improve operating procedure safety: currently, a search camera or sensor operator is at risk by not hearing shouted warnings due to a headset being worn. By incorporating RescueCom and creating a multi-solution 'system', the operator can now be warned of any dangers through the radio transmission, heard via the same headset.

The technology incorporated into RescueCom has been tried and tested under extreme conditions with NATO Special Forces. That USAR teams currently have no communications system that can link life-detection equipment operators in the field is a sub-optimal situation, but one that can now be remedied to improve life detection and rescue, as well as the safety of USAR team members. RescueCom must surely be a system worthy of note in a next installment of INSARAG guidelines.

For more information, go to www.savox.com

Bullard

The Eclipse LDX is equipped with the latest state-of-the-art infrared engine technology and image processing techniques from Bullard, the leader in thermal imaging technology for the fire service. Eclipse LDX incorporates Image Contrast Enhancement (ICE™) technology for the ultimate image performance in fire conditions. ICE technology sharpens the distinction between objects and regions and optimizes the image for greater clarity.

The Eclipse LDX runs at an ultra-fast 60 Hertz image update rate and is equipped with a new LCD display that increases brightness and improves contrast, allowing firefighters to see more clearly in thick smoke and direct sunlight. In addition, the Eclipse LDX is equipped with a new power button for easier powering on and off with a gloved hand. Weighing only two pounds, Eclipse LDX is available with a 240 x 180 or 320 x 240 ultra-high resolution infrared engine.

The Eclipse LDX can be equipped with Bullard's exclusive Electronic Thermal Throttle® (ETT), which enables firefighters to reveal hidden fire and distinguish hotter objects with the touch of a button. Other optional features include Super Red Hot colorization, highlighting high-heat scenes in brilliant shades of yellow, orange, and red; temperature measurement; and an integral DVR.

The X Factor Series of thermal imagers includes the Eclipse LDX, T3X, T4X, and Eclipse X. Bullard plans to release the T3X and T4X in the first quarter of 2015, followed by the Eclipse X. For more information about the X Factor Thermal Imagers, contact Bullard Asia Pacific office at +65 6745 0556 or email us bullardasia@bullard.com.

For more information, go to www.bullard.com/xfactor

Weber Rescue

The battery-operated hydraulic power wedge SPK 250 E-FORCE quickly establishes an initial opening for the insertion of e.g. pneumatic lifting bags, spreaders and combination devices.

Due to the low insertion height of just 8 mm, the power wedge can be used in the smallest of gaps. In this way, the flexible and manoeuvrable power wedge can lift loads with a 25 t lifting force up to 58 mm.

The power wedge SPK 250 can be supplied as a conventional hose-connected and battery-operated version (E-FORCE). The battery pack is compatible with all E-FORCE rescue equipment and the Milwaukee battery pack saws.

For more information, go to www.weber-rescue.com

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Resqtec

Replaceable crusher tips and a flexible, replaceable protection cover are the key features of Resqtec's new C4 and C6 concrete crusher. With the introduction of the concrete crushers, RESQTEC offers a total solution for USAR operations following the INSARAG guidelines.

The new flexible and replaceable protection cover of Resqtec concrete crushers sets itself apart from the rest of the market. It is attached directly to the (moving) arms allowing it to follow the movement of the arm itself. This makes the cover fold itself around the material to be crushed and ensures that the flying debris is actually stopped by the protection cover, above and under the tool. When damaged, one can easily replace the protection cover themselves.

Another innovative feature of the C4 and C6 is the possibility to replace the crusher tips. These tips are used under severe conditions and therefore wear down. Having the option to replace them certainly contributes to the effectiveness of the tool and cuts down on complete replacement tools rather than changing the tips themselves. Its compact design makes it a very user friendly tool especially in USAR operations. The C4 and C6 concrete crusher allow for easy handling and enables controlled crushing of different kind of materials up to respectively 231 / 236 mm.

Resqtec highly values user ergonomics and this was paramount in the tools' design. Like all Resqtec products the C4 and C6 concrete crusher embeds Ergonomic Weight Optimization (EWO) Technology. One of the key features of EWO is the 360° handle that enables you to hold the tool in any position that you want. Another advantage is that the 360° handle allows a 2-man operation when necessary.

The C4 and C6 concrete crusher are the latest additions to Resqtec's hydraulic rescue equipment. Resqtec develops tools from a total rescue perspective and currently manufactures one of the world's most extensive line-up of modular rescue tools with multiple usability options. No matter what scenario you encounter, with Resqtec you have the right solution.

For more information, go to www.resqtec.com

Lukas

Whether in civil defence, first response or urban search and rescue (USAR), when casualties are hard to reach, every pound counts for rescue tools and the light and compact SC 250 E2 becomes an indispensable companion.

Maximum mobility

With unique eDRAULIC 2.0 technology, you can rescue without power units and hoses but with complete freedom of movement. Besides that, the SC 250 E2 is ready for action at the press of a button. Get to work right away when it counts!

Compact power

The handy all-rounder, especially for operations where access is difficult, such as narrow tunnels or natural disasters: Cutting and spreading with a single tool and maximum flexibility in operation thanks to its size, low weight and eDRAULIC 2.0.

Save time

For its weight class, the SC250E2 demonstrates convincing cutting performance for preliminary work at rescue sites. Continue working without changing tools, spreading even narrowest openings with the flat tip to free injured people. Save time and react fast in emergencies.

Related benefits

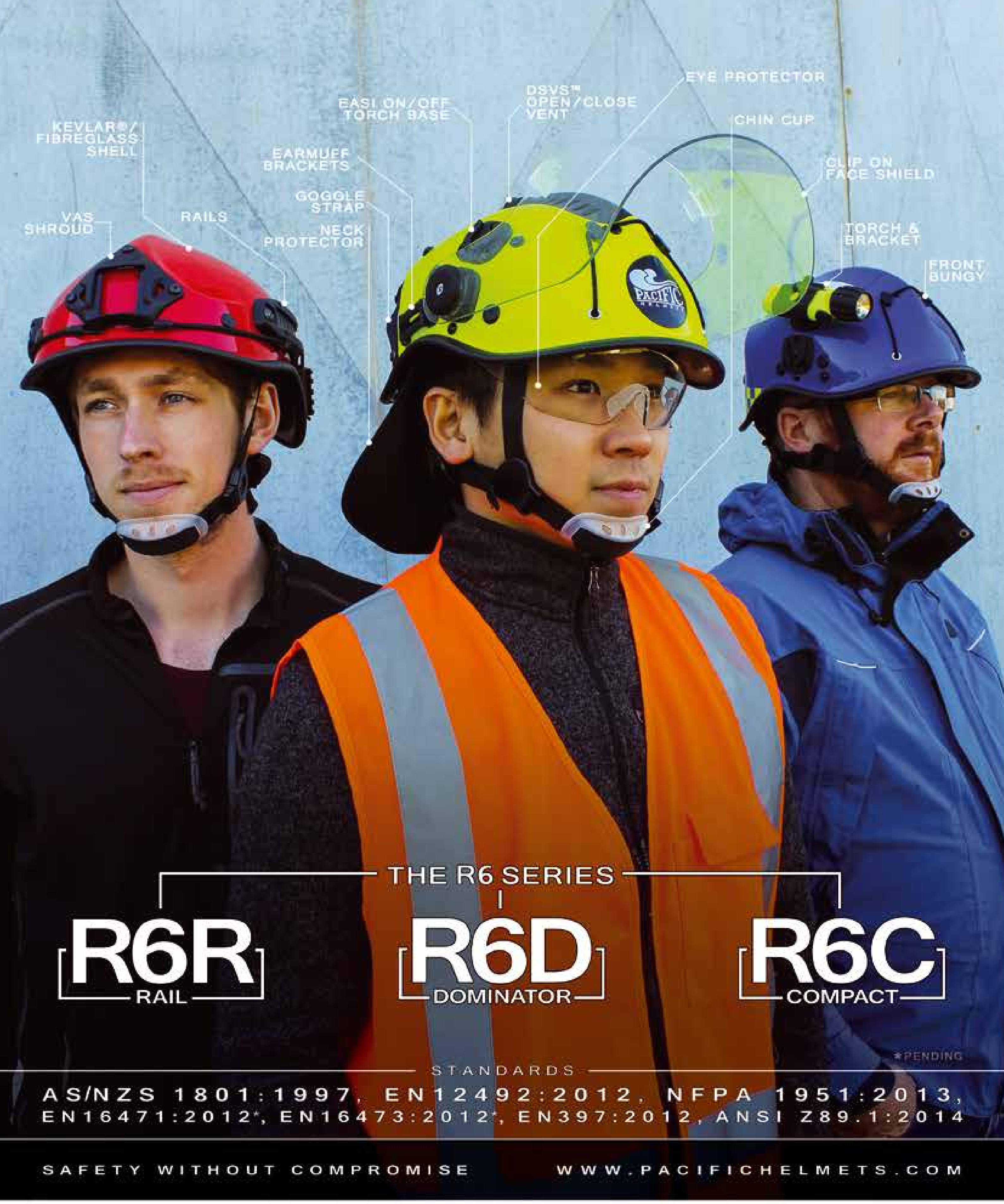
Whenever weight is the important factor: SC250E2! SC250E2 is equipped with the proven star grip control for the simplest and most intuitive operation on the market.

NEW: Superior battery technology

Our newly developed high-performance rescue battery now has a capacity of 5 Ah. That means twice the operating time in real rescue operations.

- Even lighter: only 16 kg incl. battery!
- Even more compact for improved handling.
- Minimal space requirements.
- Size and weight reduced for maximum freedom of movement.
- Cutting and spreading without tool change.
- Short opening and closing times for fast work.
- Especially suited to advance vehicles, motorcycles or helicopters.
- Total freedom with battery operation.
- Unlimited operation with power supply cable.

For more information, go to www.lukas.com



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R6R RAIL

R6D DOMINATOR

R6C COMPACT

*PENDING

STANDARDS

AS/NZS 1801:1997, EN12492:2012, NFPA 1951:2013, EN16471:2012*, EN16473:2012*, EN397:2012, ANSI Z89.1:2014

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PACIFIC HELMETS

Pacific Helmets

The R6R and R6C are the latest helmets by Pacific Helmets Ltd to join the Pacific R6D (also known as the Dominator) in the R6 Series.

The R6R (Rails) has been designed to accommodate tactical Picatinny Rails and VAS shroud for attaching extra equipment such as cameras, earmuffs, night vision goggles, and face protection. The R6R can be used in a wide variety of situations including USAR, paramedic, rescue, industrial, or wildland firefighting. Available certified to AS/NZS 1801:1997 Type 3, NFPA 1951:2013, and compliant ANSI Z89.1:2014.

If you're looking for a vented option, choose the R6D (Dominator). The R6D features our Dynamic Sealed Ventilation System (DSVS™) which is water tight when closed. This helmet can carry multiple accessories to create a helmet to your requirements and is suitable for mountaineering, USAR, paramedic, rescue, and industrial uses. Available certified to AS/NZS 1801:1997 Type 1&2, EN 12492:2012, and compliant ANSI Z89.1:2014.

The R6C (Compact) is the non-vented version of the R6 Dominator, perfect for use in Bush/Wildland Fires when no vent on the helmet shell is preferred. Featuring a lightweight Kevlar® reinforced composite shell and with many accessories available to suit your needs; the R6C can be used in a wide variety of situations including USAR, paramedic, rescue, industrial, or wildland firefighting. Available certified to AS/NZS 1801:1997 Type 3, NFPA 1951:2013, and compliant ANSI Z89.1:2014.

The R6C, R6D, and R6R can all be personalised to match your brand with customised decals (reflectors, rank markings, badges) and custom paint colours to ensure your R6 is your perfect helmet.

For more information, go to
www.pacifichelmets.com

Weber Rescue

The combination of the proven E-COMPACT compact unit with a battery drive means the new B-COMPACT is able to provide extremely mobile working.

The battery pack is characterised by its lightweight, compact design. With a battery pack as well as the oil filling, it weighs just 11.9 kg – for the same performance as any standard unit. Also, the B-COMPACT has enough hydraulic oil on board to be able to fully extend even the largest rescue ram.

Especially when working off-road in a remote location, good illumination is extremely important. Therefore, the unit also has 6 high-performance LEDs for illuminating the work space and for finding all operating elements directly.

For the power supply of the B-COMPACT, there are connection options for two battery packs (28 V). It can also be operated with a permanent 230 V by a power supply unit.

For more information, go to
www.weber-rescue.com

Leader

After the success of its search equipment: the LEADER Hasty 2 sensors version, LEADER, expert in search and rescue material, further expands its range by launching the version 3 wireless seismic sensors!

World's only multifunctional search device, LEADER Hasty combines a "search camera mode" and "wireless seismic detection mode". Specially designed to offer lightweight, mobility and efficiency, LEADER Hasty perfectly meets the needs of rescuers on the field by allowing them to make quick and reliable search.

Its dual function gives it a greatest advantage in all phases of search. A rescuer can now single-handedly, or with the help of search team members, accomplish a Hasty Search and/or a more detailed investigation of a disaster area with this multi-functional control box!

For more information, go to
www.leader-group.eu

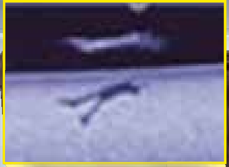
YONE PROEYE 751-SNR

SONAR Plus ™

PAT.P

Search out by SONAR and pinpoint with the Underwater Camera Head!

Great result in dark and cloudy waters!



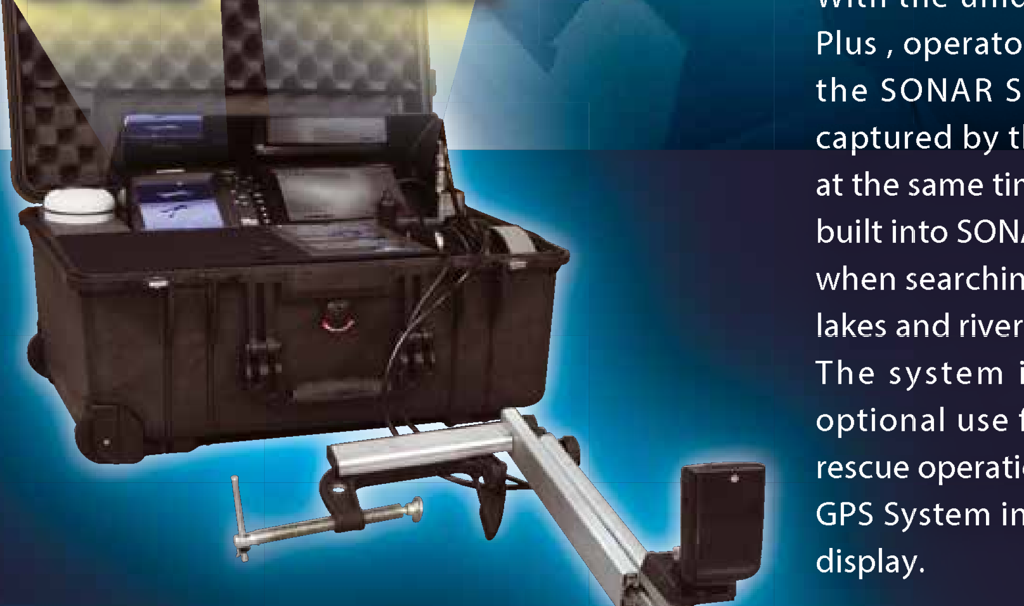
Sonar Image Display

U/W Camera Image Display

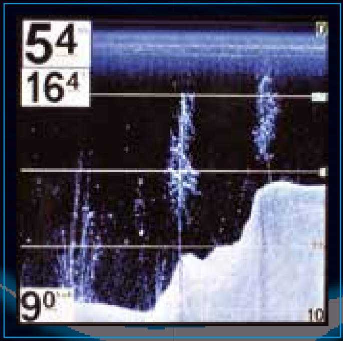
With the unique PROEYE 751-SNR SONAR Plus , operators can see sonar images from the SONAR System and real-life images captured by the Underwater Camera Head at the same time. The forefront technologies built into SONAR provides clear images even when searching the dark or cloudy waters of lakes and rivers.

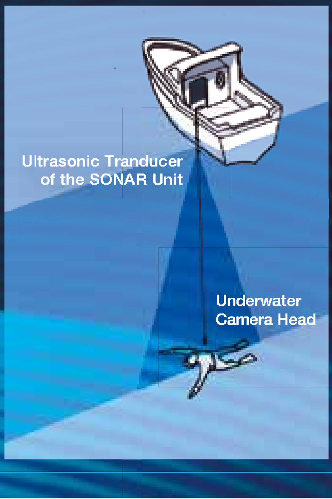
The system is designed compactly for optional use for various types of search & rescue operations.

GPS System indicates exact location on the display.



SONER Display image





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Holmatro

Lighter than ever and no concessions on performance: Holmatro introduces its new 5000 series spreaders. The most important factor in the development of this series was weight reduction, without compromising spreading force and spreading distance. This has been achieved through a combination of new materials, component integration and innovative design. The result? Five new spreaders with an outstanding performance-to-weight ratio, that significantly reduce the physical burden on the operator. Two models are also available with Greenline battery technology for increased freedom of movement.

Even more lightweight: SP 5240 CL

Within this new series, one model attracts most attention: the SP 5240 CL spreader. The letters CL stand for 'Compact Lightweight'. Weighing in at just 9.9 kg / 21.8 lb, this spreader is even more lightweight than the other, already very light, models in the new 5000 series. At the same time it offers every spreading capability you need for the extrication of a trapped victim. Like all other models, the SP 5240 CL has been tested extensively on the latest car prototypes.

Other features and benefits

Some more features & benefits of the new 5000 series spreaders are:

- Effective spreading tip profile for perfect grip
- New ergonomic carrying handle design increasing operator comfort in various working positions
- Upgraded LED lighting in carrying handle: six lights with higher light output. Never stand in your own shadow again.
- Built-in Speed Valve for quicker opening of the arms to speed up spreader positioning
- Patented CORE Technology combining oil feed and return in one hose to make rescue operations safer, quicker and easier
- On battery powered models: Greenline battery technology combining a long battery life with high capacity for maximum operational use. Advantages: self-contained for optimum freedom of movement, no emissions, low noise levels and suitable for use in all weather conditions.

For more information, go to www.holmatro.com/en/spreaders

Yone

On June 11, 2014, our staff members dispatched to Indonesia for presentation of our new product of search and rescue equipment PROEYE 751-SNR SONAR Plus were requested by the local rescue squad of Balikpapan, a city on the east coast of the island of Borneo, in a hurry for water search and rescue. The staff members immediately responded to the request by rushing to the scene and started the search activity near the Balikpapan River Estuary. For the searching, the sonar sensor of PROEYE 751-SNR was submerged in the water from a small boat and the search was conducted through the sonar system display.

The river was considerably muddy and thus the searching was very difficult. However, about two hours later, the figure of possible sufferer could be located on the riverbed about 5m deep from the surface through the sonar system display.

Due to sundown, the searching was interrupted with the location identified by the GPS sensor of 751-SNR for the rescue operation on the following day. Sadly, the sufferer was found dead the next morning.

While the searching was in progress, the family members of the sufferer wished that they would pay their own expenses for one set of 751-SNR to make a search by themselves if the sufferer could not be discovered and the searching would be prolonged.

To our regret, the sufferer was found dead as a result of our search. However, our staff members received the expression of thanks from the local rescue squad and involved parties and individuals for our assistance for the search and rescue activities. (The article shown in the left was carried on the local newspaper BALIKPAPAN POS dated June 12, 2014.)

The sonar system display provides the images in both directions vertical and lateral.

The upper left corner of the display presents the depth to the bottom of the water.

The sonar system display demonstrates that the images on the display are almost unaffected despite the considerably cloudy river water.

In addition, the display helps confirm that the riverbed is relatively smooth, the sufferer lies on the riverbed at a depth of about 5.4m below the surface, and the location is directly below the searching boat and in the left of the navigating direction of the boat.

For more information, go to www.yone-co.co.jp

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MULTI-CUT® Fire Rescue Saw

New 2100 Series includes two engine sizes: 70.7cc and 87.9cc. Each engine is designed for use with Cutters Edge Carbide Tipped BULLET Chain® to cut the widest range of materials found at fireground and rescue scenes.

MULTI-CUT® H Series Rotary Rescue Saw

New H Series is engineered and powered to work harder and operate longer in the most extreme fire and rescue conditions anywhere. The new technology engine is available in three sizes: 74cc, 94cc and 119cc. The Cutters Edge Black Star and Black Diamond Blades offer long cutting life and high speed cutting of virtually all materials. The new ***BULLET BLADE***™ will be available soon.

CE94 Concrete Cutting Rescue Chainsaw

A new technology 94cc engine and a new style Diamond chain cuts reinforced concrete up to 16-inches thick. Features a lighter weight power head and full-wrap handle for high performance concrete cutting in any position.

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A Century of Natural Disasters – What are the Costs?

Australian folklore from the last two centuries is full of tales of natural disasters. But Australia has changed drastically. The population has vastly grown and our built environment is more complex and dispersed across the landscape. Can we accurately compare the impacts of disasters from more than 100 years ago with more recent events? Bushfire and Natural Hazards CRC research will enable comparisons of natural hazard events, even if they are many years apart.

Rob Van den Honert

Lucinda Coates
Katharine Haynes
Ryan Crompton

Rob Van den Honert, Lucinda Coates, Katharine Haynes and Ryan Crompton are Bushfire and Natural Hazards CRC researchers from Risk Frontiers.

The research

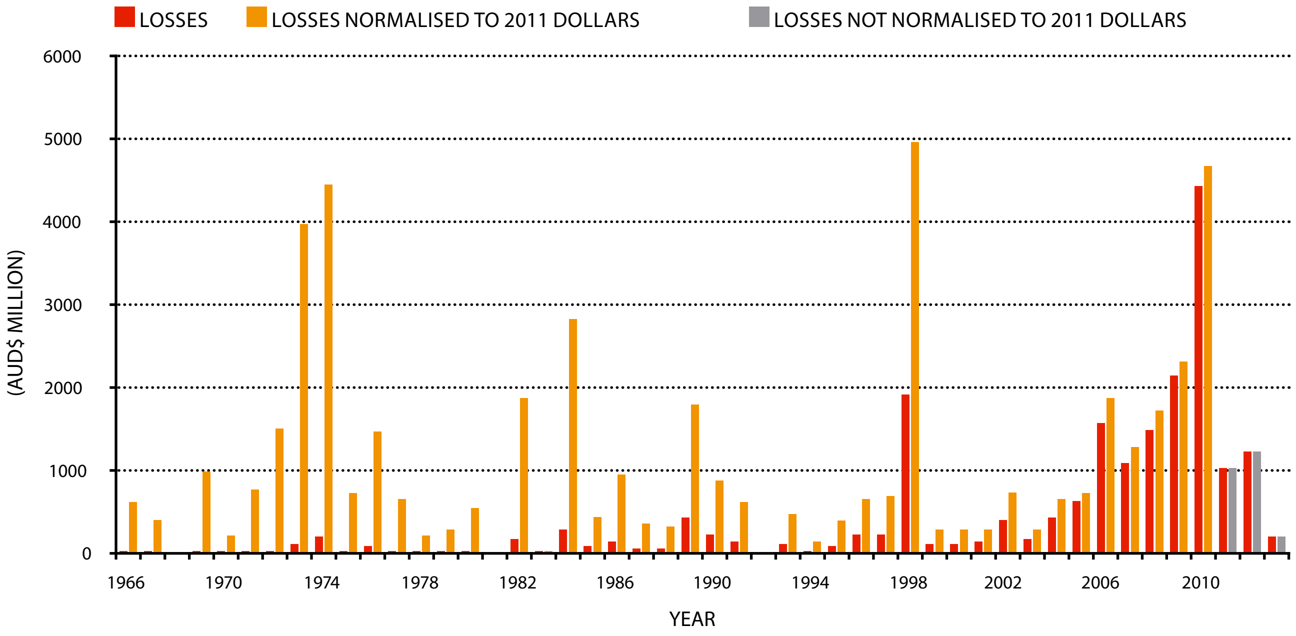
This article is based on a paper that is a first pass at quantifying the impacts of natural hazards on fatalities and building losses in Australia over the past century. The emphasis is on developing a methodology that allows the effects of societal changes (population and wealth) across time to be taken into consideration. This process, termed 'normalisation', effectively estimates the building losses or fatalities from an event as if the event were to impact present-day society, allowing a comparison of the most damaging natural hazard events, even if they occurred decades apart.

The Bushfire and Natural Hazards CRC project, An analysis of building losses and human fatalities from natural disasters, aims to measure and understand the impacts of natural hazards in terms of the toll on human life and the built environment. This examination is a fundamental first step to providing an evidence base for future emergency management policy, practice and resource allocation and to enable efficient and strategic risk-reduction

Image courtesy of Bushfire and Natural Hazards CRC

FIGURE 1: AUSTRALIAN WEATHER-RELATED NATURAL DISASTER LOSSES, 1966-2013

Data source: ICA, 2014



strategies. The analysis underpinning the project will be based on an examination of the historical record of losses caused by natural hazards in Australia since 1900. There are two distinct focuses of the research:

1. an analysis of building damage, by hazard, across time and by state or territory due to natural hazards
2. a longitudinal analysis of the social and environmental circumstances in respect of fatalities, injuries and near-misses.

This second aspect will include an examination of trends over time in terms of exposure and vulnerability. It is envisaged these trends will be interpreted in the context of emerging issues (e.g. an ageing population, spatial population shifts and climate change) and how these issues might influence vulnerability and exposure trends in the future.

Key to this project will be the collection of data relating to losses (human and building) from natural disasters, in particular flood, cyclone, bushfire, severe storm, heatwave and earthquake. Some data already exists in the Risk Frontiers PerilAUS database; the objective is to make this dataset as complete as possible.

Database of natural hazards in Australia

The study will use Risk Frontier's unique database of natural hazard impacts, PerilAUS, which has been compiled over the past 30 years. It is a comprehensive database of natural hazard events in Australia that have caused natural hazards fatalities and/or damage to buildings, agriculture, infrastructure and lifelines. Hazards covered are bushfire, earthquake, flood, windstorm, hailstorm, heatwave, landslide, lightning strike, severe rain, tornado, cyclone and tsunami. All major disasters since 1900 to the end of 2013 are covered, resulting in almost 14,500 individual events.

Where available, data has also been collected on the economic, social and environmental impacts of the event and on the number of people injured, evacuated and/or rendered homeless.

Building losses from natural disasters

Globally, insured losses caused by natural disaster events have increased rapidly in recent years. While the insured real losses are rising, the losses are seen to fluctuate wildly from year to year. Australia is not immune to this. Data from the Insurance Council of Australia's Historical Disaster Statistics list, see Figure 1, is composed of insurance industry losses from weather-related natural hazards (e.g. hail, floods and cyclones) in Australia since 1967.

The data shows an increasing trend over time – the trend is statistically very significant, and increasing at an annual average rate of $32 million per year.

What might be causing this increase in losses? Over recent years there have been societal changes, for example significant population growth and movements of some of this population to areas susceptible to natural hazards (such as river floodplains and coastal or bushland fringes). Furthermore, with this increase in population has come an increase in wealth in hazard-prone areas – homes are costing more in dollar terms and are getting bigger. The Gold Coast in Queensland is a great example – today's version is vastly different from the Gold Coast of the 1950s.

These societal changes offer a clue to the increase in insured losses from natural hazards.

But to accurately compare disasters that occurred many decades apart, sometimes more, data must be normalised. This is the process of adjusting historical losses for known societal changes (i.e. numbers of homes, the value of these homes and improvements in building codes and construction).

After normalisation the loss data shows a different picture (see figure 1). While there is substantial variability across time, there is now no statistically significant upward trend. This result implies that no signal has yet been detected to indicate that insured losses from causes other than societal changes (such as population changes and wealth growth) are increasing.

Major Australian disaster losses in dollar terms

Normalisation allows a comparison of the most damaging natural hazard events, even if they occurred many years apart. After removal of the impact of population and wealth, no single peril dominates or is responsible for most insured building losses – hailstorms (Sydney, 1999), cyclones (Tracy, 1974), earthquakes (Newcastle, 1989), floods (Queensland, 2011) and bushfires (Ash Wednesday, 1983) all feature as the most damaging events in Australia. This means mitigation against natural hazards cannot be limited to one disaster type alone.

Fatalities from natural hazards

A glimpse at human fatalities caused by natural hazards is revealing.

In a similar vein to building-loss data, an analysis of the number of human fatalities per year should be normalised to take into account population growth. Figure 2 shows fatalities from bushfires, earthquakes, floods, wind gust, hail, landslides, lightning, rain, tornadoes and cyclones in Australia from 1900 to 2010. A line through the raw data on this figure would show no significant trend, i.e. the fatality rate has been constant across time, while a line through the normalised data, Figure 3, shows a highly significant decreasing trend, amounting to around 0.7 deaths per year over the past 110 years. This finding is in line with research on global natural disasters, which indicates human fatalities are either constant or decreasing.

Natural hazard fatalities from 1900 to 2011 are recorded in PerilAUS, and show that more people in Australia have died as a result of extreme heat (4,555, or 55.2%) than from the effects of all other natural hazards combined.

For further information, go to www.bnhcrc.com.au

FIGURE 2: AUSTRALIAN NATURAL DISASTER FATALITIES, 1900-2010

(Data source: PerilAUS database, Risk Frontiers)

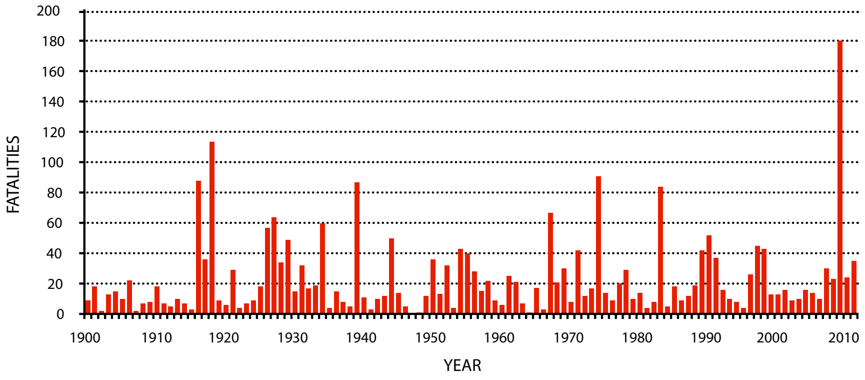


FIGURE 3: AUSTRALIAN NATURAL DISASTER FATALITIES, 1900-2010 - DATA NORMALISED TO 2010 NUMBERS

(Data source: PerilAUS database, Risk Frontiers)

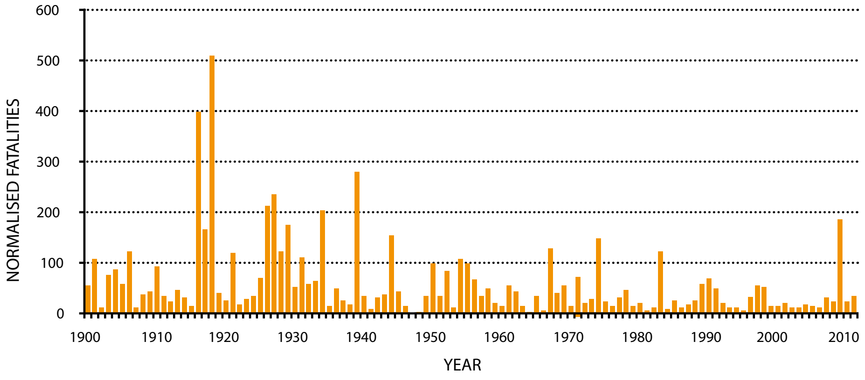


Image courtesy of Bushfire and Natural Hazards CRC

Improving Safety and Performance on the Fireground

Command during a disaster is a complicated and stressful time, the more we learn about how we react and make decisions the better we can handle ourselves and improve the quality of decisions we make.

Dr Carl A. Gibson

Ivan Pupulidy

Dr Carl A. Gibson is the Director of Risk Management at La Trobe University, Melbourne Australia and is a volunteer lieutenant and training officer for the Country Fire Authority.

Ivan Pupulidy is the Director of the US Forest Service Office of Learning.

Introduction

Firefighters and other emergency and disaster workers often place themselves into situations of personal danger, in work environments where the risk of physical injury, psychological harm or fatality is not uncommon. Firefighters often accept risk commensurate with a sense of reward that is often tied directly to their identity. This equates to a mission focus that can blind them to changes in the environment, where risks are not static, predictable or controllable. When faced with such changing risks there is a natural demand for better communication and group sensemaking. *Sensemaking is the process by which people work to understand issues and events that are novel, ambiguous, confusing, or in some way outside our expectations. Sensemaking is both an individual and a collective or group activity that is context dependent. Individuals engage in sensemaking to understand an unfolding event; however, it is also retroactive, in that the process involves people building meaning based on observed circumstances that they perceive to be true. Sensemaking involves situational awareness but is more encompassing and comprises: how we become aware of what is happening around us (changing conditions), our capability to build connections between changing conditions; differentiate 'signal' from 'noise'; use our memories, expertise, emotions and reflection to analyse, create relative frames of reference, and create a plausible (shared) narratives or meaning.* However, this is often countered by tactical, technical and social demands which distract front line operators.

We have developed a practical approach to help first responders to recognize shifting risk, called Margin of Manoeuvre or MoM, which is being introduced to early adopter groups of wildland firefighters in the USA and Australia as a trigger for sensemaking and adaptive thinking.

The Context for Innovation

Wildland fire operations have an unenviable record of fatalities, one that is shared by other high-risk, low frequency of event industries (e.g. timber harvest, aviation, oil extraction, mining, etc.). Since 1994, with the catastrophic loss of firefighters at Storm King Mountain, the US wildland firefighting community has suffered over 400 fatalities, attributed to a number of causes.

In the belief that the past is a good indicator of the future, it has become common practice to review catastrophic events to try to create prevention strategies. This has resulted in efforts to manage risk with ever more restrictive regulation or constraining organisational controls. However, the environment that first responders face is a complex adaptive system characterised by uncertainty, meaning that prediction is difficult and often misleading. A major missing piece has been the need for creating lessons learned and innovation to improve decisions and actions in real time.

In real-time operations there is often a perception that rapid action is required due to time constraints. Most of the time the intuitive, traditional, rote, ritual or habit-based responses combined with minor innovation, work well enough to deliver successful outcomes. However, in different circumstances the same adaptations that resulted in success can deliver a much different result.

To improve their work and reduce the risk associated with uncertainty in real

▶ **DM Hoberman sphere used to demonstrate contracting MoM.**

time, firefighters need to better recognise when to engage in sensemaking. They need to consider different leading indicators that will direct their focus and use their expertise to read the current and changing conditions with which they are faced. Initial practitioner response during wildfires during 2014 and in early 2015 confirmed that Margin of Manoeuvre can provide an effective way to recognize such changes in the operational environment.

What is Margin of Manoeuvre?

We have conceived MoM as a (visualised) sphere that represents the amount of 'space' an individual or team has, within which they have to prepare for and respond to challenges arising from changes in the operational context/ environment. The larger the sphere (the larger the MoM) the more room there is to experiment, make errors, learn from those errors and generate adaptations to challenges. The smaller the sphere (the smaller the MoM), the less room to experiment, and the more likely that errors will have unrecoverable harmful consequences.

We have trained firefighters and other emergency responders to visualise MoM as a virtual sphere. In training we use a Hoberman Sphere (a plastic expanding science toy see adjacent photos) to represent MoM. This provides hands on visualisation of a contracting or expanding MoM as they analyse the situation and their capabilities to manage it, and helps to consolidate the concept as an embedded mental model for subsequent operational use. Firefighters monitoring change in their MoM use it as a warning indicator and as a trigger for increasing attention and for considering a different approach or action. This allows for the influence of a wide a range of internal and external factors to be considered in a simple concept of contraction or expansion of MoM (see table below).

First responders have reported using MoM operationally:

- To identify and capture unpredictable changes in the system;

📷 Image courtesy of Dr Carl A. Gibson

Contributing Factor	Operational example
Task scape: includes the nature of the mission and tasks to be undertaken, clarity of objectives, how complex the problem is, time constraints, degree of uncertainty and ambiguity present regarding actions and priorities.	Fast moving wildfire, with multiple leading edges; Incident Controller has relayed multiple objectives and only vague instructions; lack of agreement between crews on priorities: **Result – MoM decreases.**
Hazard scape: presence, severity and complexity of hazards and threats, interrelationships and amplification among hazards and threats, changes in patterns of exposure.	Wildfire: Crews are moving from gentle undulating grazed paddocks into grass scrub with significant fuel loads and increasingly hilly; wind speed increasing and gusting, changing direction; exposure to increasingly dangerous trees. Structural fire: presence of dangerous goods, multiple floor levels involved, neighbouring exposures. **Result – MoM decreases.**
Interoperability scape: the type and number of interrelationships, interoperability of different groups SOPs, practices, equipment and communications, familiarity and experience with combined operations.	Participation of large numbers of agencies; substantially different modes of operation; lack of experience in multiagency response; rivalry between agencies or teams. **Result – MoM decreases.**
Sensemaking: the ability of individuals to focus, attend to, sort signal from noise, analyse, use intuition to make sense of changing conditions. Cultural and procedural factors that allow sensemaking to be shared within and between different groups, including briefing, review and reflection approaches, presence of formal structures, such as incident management systems, warning systems, etc.	Firefighters trained and experienced in controlling the emotional thinking system and in improved sensemaking; effective skills maintenance training; extensive fireground experience; high level interpersonal and communication skills; trusting relationships; well rested crews, etc. **Result – MoM increases.**
Emergent leadership: ability to identify, and capture and utilise different expertise and leadership skills from different individuals as conditions change. Includes the ability to recognise emergent problems and the emergent properties and respond accordingly.	Strike team leader is willing to defer to a more junior firefighter from a local brigade who has better knowledge of the local environment and familiarity with the conditions. **Result – MoM increases.**
Innovation (Adaptation): the individual's and team's ability to respond to dynamic conditions by creating novel solutions. Includes the ability to learn from success and failures, and successfully transform future operations.	Crews perform 'on action reviews' whilst refilling tanks – use the learning to adapt tactics for return to the fireground. **Result – MoM increases.**
Capability to act: the availability and capacity of resources (including people, equipment, consumables, information and technology) and systems of work; their level of reliability, robustness, redundancy, and resilience.	Firefighting equipment and vehicles are well maintained and fit-for purpose; Additional fresh crews are being deployed from long haul strike teams; up to date information is relayed to sector commanders; reserve capacity is on call. **Result – MoM is increased.**

- As a common language to discuss unpredictable changes;
- As a way to trigger sensemaking, including capturing senses, intuition and feelings of change in the system that are difficult to articulate;
- To more rapidly improve expertise through dialogue.

Conclusion

MoM provides an alternate approach to fostering adaptation and resilience in a wide range of operational and strategic contexts. Central to adaptation is the ability to experiment and try out alternative options or solutions. Such experimentation has to involve making errors, because some options will be feasible, whilst others will not. For effective adaptation (the core feature of resilience) to occur, first responders need to be able to operate in sufficient 'space' that allows these errors to be made, corrected, recovered and critically, for lessons to be learned and acted upon. The MoM is way of conceptualising the extent of this space. Hence, the larger the MoM the greater room for error, recovery and learning. The smaller the MoM, the more likelihood that errors will have severe and unrecoverable consequences and any opportunity for learning will be lost.

MoM is successful because it exploits how the brain works and helps to avoid some of the mental traps that occur in non-routine situations. A first responder will often be presented with such a huge range and volume of information that their working memory and analytical thinking system will be overwhelmed. Working memory can hold only a small amount (about five pieces of information) at any one time, and as new information comes in, previous information has to be discarded. This means that key information can be missed or discarded, resulting in an incomplete understanding of the situation. For the first responder on the ground, using MoM actively reduces the amount of information that needs to be held in working memory, ensuring that it is continually being freed up, allowing the continuing stream of incoming information to be more effectively dealt with.

For more information, go to Carl.gibson@latrobe.edu.au

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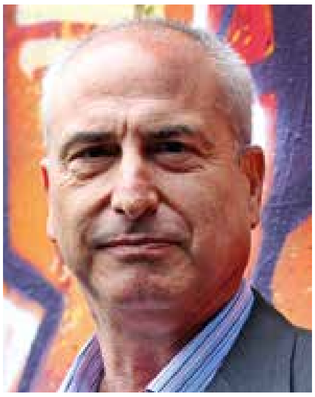
Pedestrian Modelling in a Fire Environment

As in many parts of the world, Australia has a two-prong approach to the fire safety design of buildings. The first is a traditional prescriptive approach and the other is an engineered performance based approach. In both cases the National Construction Code's Building Code of Australia (BCA) governs building design. Therefore the BCA specifies the rules of engagement in our performance-based design environment.



Jonathan Barnett
PhD, FIEAust, FSFPE, MSFS

Blair Stratton
MIEAust, MSFS

Jonathan Barnett is Technical Director of RED Fire Engineers.

Blair Stratton is Manager of Victoria RED Fire Engineers.

The performance-based environment is based on Objectives and Functional Statements leading to Performance Requirements. These requirements are specified by the Australian Building Codes Board (ABCB) and generally adopted by each state and territory. These are not just for fire but also for all aspects of building design including, for example, structural elements. A typical Objective is "safeguard people from illness or injury due to a fire in a building" and the associated Functional Statement is "allow occupants time to evacuate safely".

There are two ways of achieving this, one of which is the traditional prescriptive approach called "Deemed-to-Satisfy" (DtS). By definition, meeting the requirements of this approach meets the Objective. On a side note, there is no guarantee that the DtS approach will actually meet the objective, just that it is assumed to do so and so codified by legislation. The DtS approach is often based on a historic solution, which over the years appears to have been a successful methodology for achieving society's expectations. However, it may fall apart as new materials of construction are introduced along with new design approaches and applications.

The other way of meeting the Performance Requirements is through the use of an Alternative Solution (AS). The AS may be shown to be adequate simply through an equivalency evaluation to the DtS; in which case it has the same safety limitations, advantages and shortfalls of the DtS approach. Alternatively the AS may be shown to meet the Performance Requirements through engineering analysis, as would be found in a Verification Method, Expert Judgement or using appropriate Documentary evidence.

Usually, the design process follows the International Fire Engineering Guidelines that culminates in the production of a Fire Engineering Report (FER) that justifies and documents the AS. Once the building is built the systems are usually checked through a commissioning process.

This paper discusses a case study where a building was built incorporating a complex AS into the egress design, yet the system was never properly implemented. Evaluating the existing design and programming the building control systems based on computer simulation was the highlight of this project.

Case study – Improving egress from an existing high rise building

A thirteen-storey high-rise building in Melbourne was designed in the early 2000's using an Alternative Solution. The BCA's DtS provisions specified that two pressurized, fire isolated stairs were required. The FER provided justification for the use of a single non-pressurised stair to serve the upper levels, with the lifts being available for evacuation from the 'fire floor' (the floor of fire origin, which in practice meant the floor where the fire was first detected by one of the building's fire detection systems). The FER required additional active fire safety systems beyond that required by DtS. These

Image courtesy of RED Fire Engineers

included two separate sprinkler zones on each floor (to distinguish between fire in an apartment versus one in the common corridor), addressable smoke detectors throughout the building including apartments, and corridor exhaust and pressurization systems.

The FER outlined a strategy whereby on fire detection (unless sprinklers in a common area activate), both lifts go to the ground level to let passengers out. After that, one of the lifts (selected at random) is available for calls to the floor of fire origin, if it's on levels nine to twelve only. The other lift was to remain at the ground level for use by the fire brigade. Levels ground to eight are provided with two stairs hence the lifts were not required to serve those levels.

◀ Figure 1 – Lift for Emergency Evacuation.

▼ Figure 2 – Pathfinder Model.

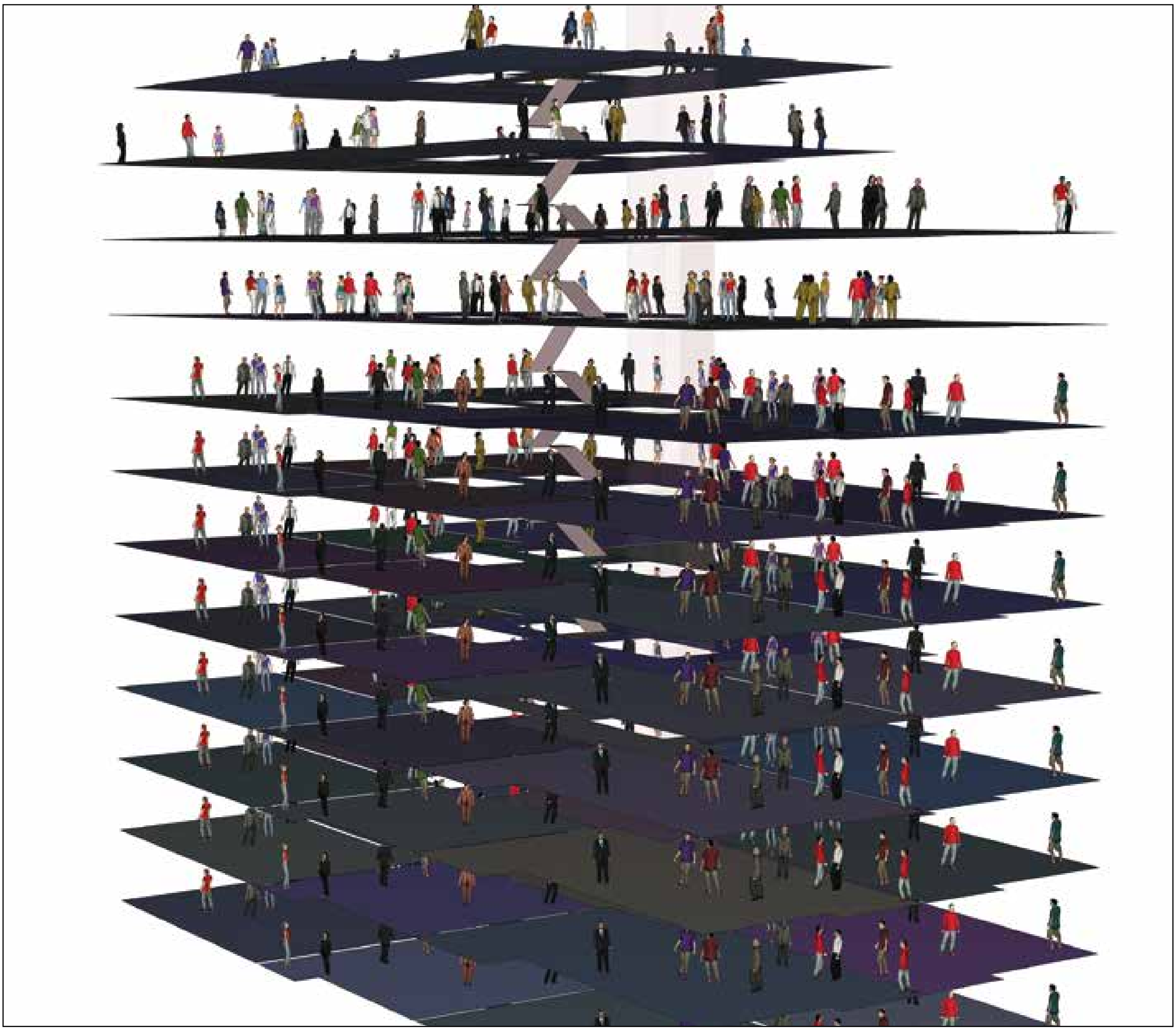


Image courtesy of RED Fire Engineers

Image courtesy of RED Fire Engineers

The AS required the lifts to be used for evacuation (see Figure 1) from levels nine to twelve only, and only for the level of fire origin. For example, a fire on level nine would require the occupants of levels ten, eleven and twelve to use the stairs to evacuate.

Whilst carrying out some upgrade works the building's owners found that the AS had not been implemented correctly. The main issue was that the lifts had never been programmed to provide egress during fire. This needed to be urgently rectified to provide a second means of escape from the high-rise parts of the building (the high-rise parts of the building started at level nine where the height exceeded twenty five metres).

Due to the complexity of the system the residents did not understand what evacuation options were available to them during a fire. The AS did not define any methodology of notifying occupants which level the fire had actually been detected on, or which system to use (stairs, lift or both).

Therefore, residents might wait in the lift lobby for a long time before realizing that the lifts were not available for egress and that they should either retreat back to their apartment or use the single fire isolated stair. In practice, the confusion and lack of training and information meant that all able-bodied residents would try to evacuate via the single stair.

Because the lifts were not used during evacuation this placed more reliance on the single non-pressurised stair. This increased the time for evacuation, and ultimately the risk to occupants.

The owners' main objective was to make use of the existing systems as far as possible, whilst simplifying the evacuation scheme and meeting the performance requirements of the BCA.

We evaluated the situation and proposed to alter the lift operation to allow occupants on any of the high-rise levels (levels nine to twelve) to use the lifts during fire regardless of the floor of fire origin.

To achieve these goals we carried out evacuation modeling using the software package Pathfinder (see Figure 2) to benchmark how long occupants would take to evacuate if all requirements of the original AS had been implemented correctly. We then modelled the evacuation time for the new evacuation scheme. The new scheme had the following main features:

- Lifts are available to all floors served by the single stair during any fire scenario, except for a confirmed fire in a lift lobby. This is instead of the lift only serving the level of fire origin. This reduces confusion to occupants yet had minimal impact on the evacuation time from the fire floor and actually decreased the overall evacuation time for the building.
- Evacuation signals cascade to two levels above the floor of fire origin and one below, at thirty-second intervals. This is in line with industry practice that had been implemented in the original construction. The original FER required a single 120-second delay between the first floor being notified and occupants on all other floors being alerted.

The results of the egress modelling is summarized below left.

Fire origin	Lift sequence	Time to clear each level (s). Floor of fire origin in red.				Total time to evacuate building (s)
		Level 9	Level 10	Level 11	Level 12	
Level 9	Lift serves L9 only (original sequence)	611	727	716	745	989
Level 9	Lift serves Levels 9-12 (new sequence)	611	662	720	779	900
Level 10	Lift serves L10 only (original sequence)	810	606	716	745	995
Level 10	Lift serves Levels 9-12 (new sequence)	642	606	675	735	923

Interestingly, although any occupant on the upper four levels could now use the evacuation lift, the pedestrian modelling showed that the evacuation time was not increased from that which was predicted based on the original scheme. This was because the cascading alarm system effectively provides occupants of the floor of fire origin the ability to wake up first, start moving and get 'first dibs' on using the lift to evacuate.

The end result is a building that meets the objective of the BCA with minimal disruption to its occupants.

Conclusion

In Australia the use of a performance-based option often allows innovative and flexible design. Modern analytic technics using computer simulation of fire and egress often play a key part in the performance-based design world. This paper discussed how the use of a modern egress modeling tool justified deviations from the original design allowing continued occupation of an existing building with no disruption and little expense.

For further information, go to www.redfireengineers.com.au

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To Burn or Not to Burn?

Australia has a long and continuing history of burning in its forests to reduce fuels and maintain biodiversity. However, the debate over prescribed burning targets has been an ongoing one for almost as long as the practice has been conducted. Parties on all sides of the debate quote evidence both for more burning or less burning.

Dr Richard Thornton

In more recent years the calls by both sides of the discussion have become louder and more polarised. Meanwhile, the complexity of the issue has actually grown. The number of people and businesses have grown in and around the previously empty forested regions; the impact of smoke is an issue; the management of water catchments is important; there is now more scientific evidence on the benefits and downsides of various fire regimes; and the windows for undertaking prescribed burning have shrunk due to drought and climate change.

There is no universal 'right' level of prescribed fire because there are competing objectives to be considered, vastly differing ecosystems to be covered, and constantly shifting variables in demographics and land use.

And even if you get all the objectives lined up you are still at the mercy of a fickle Australian weather system – too dry can be too dangerous to burn, too wet and little will burn.

Overlaying all of this are successive changes in governments at the local, state and national level – all with differing positions and varied appetites for land management policy. The list of public inquiries into these matters is long and goes back decades.

Following the devastating Black Saturday fires in Victoria in February 2009, the subsequent Royal Commission conducted the most comprehensive consideration of prescribed burning in southern Australia with a panel of scientific experts. Despite the members of this panel having a history of a range

▼ There is no universal 'right' level of prescribed fire because there are too many competing objectives.

Image courtesy of David Bruce, Bushfire and Natural Hazards CRC

Image courtesy of David Bruce, Bushfire and Natural Hazards CRC

Dr Richard Thornton is CEO of the Bushfire and Natural Hazards CRC.

▶ **Both the Bushfire and Natural Hazards CRC, and Bushfire CRC, have conducted a wealth of research into the effectiveness of prescribed burning. Pictured is a study undertaken in South Australia's Ngarkat Conservation Park in 2008.**

Image courtesy of David Bruce, Bushfire and Natural Hazards CRC

of views on fuel reduction, the panel achieved a rare consensus on the need for more prescribed burning. An agreed burning target of 5% was only to apply in the foothill forests.

However, the final report of the Royal Commission recommended that Victoria commit to burning a rolling annual target of 5% across all public land – more on that later. Although this was a recommendation that was put only to the Victorian Government, most other states are also considering it as a target.

With many prescribed burns now conducted close to the expanding urban fringe neighbourhoods and close to essential infrastructure and agriculture, community tolerance levels are very low to heavy smoke and potential damage to delicate ecosystems. This has not been helped by some significant escapes of prescribed burns which have caused extensive loss of houses and placed lives at risk. In particular an escaped prescribed burn near Margaret River in Western Australia in 2011 led to a complete ban on burning close to townships in WA and caused the land management agency to completely rewrite its risk management processes.

Risk reduction

Setting a target, however, is not an end in itself. Australian ecosystems have evolved to need some level of fire, but the return and intensity level varies dramatically depending on the type of ecosystem.

Importantly, fire is applied to various ecosystems for other reasons than just fuel reduction. This may include the preservation of ecosystem values such as biodiversity, water yield, soil preservation and other objectives

It would seem sensible to link the level of hazard reduction to the level of risk reduction of individual communities rather than just an arbitrary area-burnt target that is not linked to a prioritised objective. Without objective-based measures there is no answer to the question about what is the right amount of land to treat.

Having prioritised risk-based measures will enable government to weigh up various treatment options across multiple hazards. The alternative is to consider prescribed burning in isolation of all other options, which may result in perverse outcomes such as spending money chasing artificial targets for a minimal reduction in risk to the assets being protected. For example it may be better to focus on achieving fuel reduction around townships and key assets, rather than burning large remote areas. Although the area burnt will be much smaller in the former and the cost higher, there is a greater reduction of risk. This, of course, will not aid the chasing of hectares-burnt totals.

Targets for hectares burnt each year do have some merit in providing tangible measures against which government departments can set budgets and measure accountabilities. But the targets should be tempered with a measure of how many houses and assets were actually protected.

Cross tenure issues

The 2009 Victorian Bushfires Royal Commission had a focus on the role that fuel levels on public land played on the fires of Black Saturday. It was almost entirely silent on the role of fuels on private land, despite the fact that most deaths and damage to private assets resulted from the fires traveling over private land.

Image courtesy of Nathan Maddock

It would be wrong to assume that by setting targets only for public land that all the risks to people and property can be resolved. The idea that people should not consider the fuel levels on their own property and risk that it poses to themselves and others is inconsistent with the arguments and scientific evidence about the important role of fuels within 100 metres of properties and inconsistent with all notions of a 'shared responsibility' when it comes to land management. Resident responsibility for their own land cannot be ignored simply because the government is treating the public land.

Of course, this responsibility is well accepted by many Australian landowners; many who vehemently berate local authorities for not respecting their side of the agreement with effective land management practices or not allowing targeted fuel reduction. This is also underpinned by council regulations, community messaging and enforcement. However, how to undertake prescribed burning on smaller properties remains a challenge, as well as the impacts of smoke from burns on community amenity and business operations, in particular the wine industry across Australia.

Limits to burn targets

The Bushfire and Natural Hazards CRC and its predecessor the Bushfire CRC, as well as many other Australian research organisations, have accumulated decades of research into the bushfire hazards faced by Australian communities. Much research has been conducted on prescribed burning that includes a cost-benefit analysis of the risk, the economics of burning, the environmental impacts across varied types of landscapes, and the acceptance of prescribed burning by rural and interface communities.

It is important that whatever burning targets are in place, that they are based on the best available evidence and scientific research. They should be measurable, achievable and articulated in such a way that the community can understand their residual risk.

And this residual risk must be accepted by the community and by governments – no hazard reduction target will reduce the risk to zero.

Fuel reduction can decrease fire intensity, flame height and the forward rate of spread. But the effectiveness of this reduction is strongly dependent on the weather conditions that prevail on the day they are impacted by a wildfire. On extreme high-temperature and high-wind days like Black Saturday, the effectiveness of most prescribed burning on stopping runs of large fires will be minimal because medium and long range spotting will see these areas overrun.

However, the fuel levels around properties and communities can make a significant difference to the intensity of the fire as it impacts private and public assets.

Meanwhile, as the debate still rages and inquiries continue in Australia over the merits and timing of prescribed burning, many local land management authorities are just getting on with the job – and dealing with the equal mix of complaints and praise on a daily basis.

▲ The escaped burn near Margaret River in 2011 led to a huge change in risk management of prescribed burning in Western Australia.

For further information, go to www.bnhcrc.com.au

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Standards Australia – Playing Our Part in Fire Safety

When we think about fire safety, and the fact that so much of our time is spent indoors, it becomes clear that fire safety rules need to be written into the codes and regulations for our buildings. Not only do we need to mitigate the potential damage and casualties from fire hazards by ensuring appropriate working smoke alarms, sprinklers and evacuation procedures, we need to start with prevention and protection by using the right building materials in the first place.

Jennifer Harwood

Jennifer Harwood is Senior National Sector Manager, Standards Australia.

The November 2014 high-rise apartment fires in Melbourne's Docklands have provided an unfortunate testament to this fact. More than 500 people were evacuated from a high-rise apartment building as a fire broke out. The damage to the building was estimated at $2 million. While the cause of the fire was deemed accidental, a report by the Metropolitan Fire Brigade in Melbourne says that the external cladding for the building did not comply with combustibility standards for a high-rise building, and contributed to the swift spread of the fire from floor to floor, which burnt vertically from the sixth storey to the top of the building on the 21st floor. Thanks to the speedy work of the fire fighters and the building's sprinkler systems, all occupants were evacuated quickly and further damage was prevented.

Fire safety requirements in Australia's building code

In Australia, fire safety requirements are set out by the Australian Building Codes Board (ABCB) in the National Construction Code (NCC). The NCC provides performance requirements for many aspects of building and construction which are based on outcomes. For example, the regulators may call for all buildings and fittings to be constructed in a way that meets minimum performance requirements for combustibility, and for all buildings to install up-to-date fire detection

Image courtesy of Standards Australia

and sprinkler systems. These requirements are set out in the NCC, which may then refer to Australian or international standards as one way for builders to meet these requirements.

Some fire-related Australian standards referenced in the National Construction Code include the joint Australian/New Zealand Standard AS/NZS 1530 *Methods for fire tests on building materials, components and structure*; AS/NZS 1668, *The use of ventilation and airconditioning in buildings, Part 1, Fire and smoke control in multi-compartment buildings*; and AS 3786 *Smoke alarms*, to name a few.

Image courtesy of Standards Australia

Our role in the standards and conformance system

But having the right standards is just one part of the story. As shown by the case of the Melbourne Docklands fire, applying and complying with standards is quite another matter. And we all have a role to play.

On Standards Australia's part, we work closely with the Australian government and stakeholders from the industry and community to develop Standards related to fire detection and fire safety, which are referenced in Australia's building and construction code.

We are a developer of Standards; we do not enforce, regulate or certify compliance with these Standards. What we do is to form technical committees by bringing together relevant parties and stakeholders. Through a process of consensus, these committees develop standards and technical documents for Australia's net benefit. It is then up to regulators to make these standards mandatory in their regulation and to enforce them.

In the same report on the Melbourne Docklands apartment fire, the Metropolitan Fire Brigade called for people in the building industry – such as designers, surveyors and certifiers – to adopt building products with current certificates of compliance to fire safety standards, and to ensure compliance with all conditions imposed on the certificate.

International cooperation on standards

While it is important for all stakeholders to work together on a harmonised standards and conformance system, it is equally important for countries to work together on the global level to share best practices and technology.

On the international front, we have been very active in strengthening our partnerships with other countries. An exciting project underway is in New Caledonia in collaboration with AFNOR, the French national standards body. As a start, we will share best practices, experiences and information in the realm of building and construction standards, with a focus on harmonisation. This project will be of mutual benefit and could potentially boost two-way trade and investment between Australia and New Caledonia.

In a first project of its kind, Australia and Singapore are working together with the International Organization for Standardization (ISO) to strengthen Myanmar's capacity to participate in national and international standards development. Building and construction standards were identified as a key focus area. The goal is to enhance trade and economic benefits for Myanmar and the region through setting up business-friendly standardisation infrastructure based on international systems.

Work is ongoing at the ISO and International Electrotechnical Commission (IEC) on fire-related international standards. The ISO/Technical Committee 92 on Fire Safety has been active since 1958. ISO/TC 92 works on standardization of the methods of assessing fire hazards and fire risk to life and to property; the contribution of design, materials and building components to fire safety; and methods of mitigating fire hazards.

ISO/TC 92 is currently working on revising ISO 13943 *Fire safety – Vocabulary*, which was last published in 2008. This international standard provides a harmonised set of definitions and terminology for all fire safety standards by the ISO and IEC.

Joining 33 other participating countries and 35 'observing' countries, Australia is proudly represented on ISO/TC 92 through Standards Australia's national committee of fire safety experts, FP-018. The Technical Committee FP-018 is one of our 15 technical committees and 35 working groups on comprising nearly 340 professionals and experts from the fire safety sector.

Standards Australia will continue to work with stakeholders to contribute to the national and international conversation on fire safety. And while it is an important conversation to have, it is ultimately the follow-up actions that will matter the most.

About Standards Australia

Founded in 1922, Standards Australia is an independent, not-for-profit organisation, recognised by the Commonwealth Government as the peak non-government Standards development body in Australia. It is charged by the Commonwealth Government to meet Australia's need for contemporary, internationally-aligned Standards and related services. The work of Standards Australia enhances the nation's economic efficiency, international competitiveness and contributes to community demand for a safe and sustainable environment.

For further information, go to www.standards.org.au

Understanding the Basics of RoIP and VoIP

By better understanding the terminology & considerations involved, organizations can ensure the IP network meets their requirements. This article shares some IP data basics for using internet protocols to transmit radio voice and data.

Paul Whitfield

Radio over IP (RoIP) is a generic term that describes the application of Voice over IP (VoIP) on two-way radio networks. So all digital radio networks with IP connectivity use RoIP. For radio fleet operators, RoIP can lower costs, improve reliability and increase interoperability in the following applications:

- access to remote radios,
- point-to-point, point-to-multipoint and cross-band connection,
- radio-to-dispatch console links,
- radio-to-telephone gateway,
- by reducing cabling.

All of these applications utilize IP infrastructure – the IP backbones that make up both local and wide area networks.

VoIP

Originally designed as a telephone replacement, VoIP allowed large service providers to connect many users for voice communications on demand. VoIP and RoIP use the same mechanism to transmit voice or audio data. However, radio has additional capabilities when it comes to signalling and control. These include:

- Push-to-Talk (PTT) indicates the radio should transmit and must be synchronized with the audio,
- Carrier Operated Switch (COS) from the radio generates a busy signal or keys up another transceiver,
- Type of call in progress (Broadcast, Group or Individual calls),
- Radio identification,
- Advanced radio features (Stun, Revive, Remote Monitoring, Emergency),
- Channel profile change (can include frequency and other operating parameters).

VoIP Standards

Using VoIP standards to implement RoIP provides several advantages. They improve vendor-independent interoperability and integrate radio networks with existing phone and voice systems. They are compatible with off-the-shelf voice recorders, routers, firewalls and network tools.

Image courtesy of iStock Images

Paul Whitfield is Team Leader of Software Engineering at Omnitronics.

There are many standards that are relevant to voice and multimedia communications, none of which are interoperable. However, SIP and RTP are common protocols. DMR (AIS) and APCO P25 (DFSI, ISSI and CSSI) standards use both RTP and SIP.

Session Initiated Protocol (SIP)

SIP is a standard protocol used to set up and disconnect VoIP calls. It determines IP addresses of remote devices and UDP Port Numbers for RTP and negotiates which features can be used. No audio is transmitted via SIP. SIP devices include:

- devices that create and manage a SIP session, such as a radio-to-VoIP gateway or a SIP VoIP phone,
- servers, such as a Registrar Server that stores device registration information in a database, and Proxy Server that re-routes requests or messages. (A SIP server may be both a registrar and a proxy server at the same time.)

Real Time Protocol (RTP)

RTP provides data transport for audio and video over IP in telephony, video teleconferences and television. Designed for end-to-end, real-time transfer of stream data, it prioritizes "real time" over reliability, often compromising audio/video quality for immediate delivery.

RTP can send voice and radio information, but requires more system configuration and is less flexible to operate. However it can be used for unicast or multicast links, and can manage issues that occur when sending data over packet-switching networks. For example RTP can detect lost data packets, and can rectify packets arriving in the wrong order, or with variable packet delivery delays (packet jitter).

Common VoIP Issues

Delay. Two types of delay occur within packet switched networks:

- constant delays or "latency"
- variable delays or "jitter"

To compensate for jitter, the end device keeps a buffer of audio data so that it can continue to play audio even if the next packet is late. This in itself can be another source of delay.

Radio PTT means that these systems tolerate delay better than telephone systems, provided PTT signalling is synchronized with audio signalling so that no leading or trailing syllables are cut off.

Image courtesy of iStock Images

Echo

Without delay, echo is not usually an issue for system users. Once a delay is added, the echo may be audible. Echo can be eliminated using Digital Signal Processors (DSP) to process the audio, where echo cancellation algorithms filter the echo signal from the received audio.

Packet Loss

Sometimes data packets don't make it to the receiver. Fortunately, digital voice is generally intelligible with quite high levels of packet loss as VoIP systems incorporate Packet Loss Concealment (PLC) algorithms to compensate. Well-designed RoIP systems can provide acceptable, intelligible audio with packet loss of 10%.

On wired networks (LANs or WANs), packet loss generally only occurs as a result of overload or congestion. However, WIFI networks or Microwave links are subject to loss of individual packets.

System designers and operators need to be aware that their communications may depend on other devices that may be less tolerant of packet loss.

A word about CODECs

Codecs (Coder/Decoders) transport voice through packet switched data networks. Software codecs take digitized audio and encode it to send over the network, compressing the audio, so less data is required to transmit it. Codecs for VoIP compression by discarding some audio information, potentially reducing audio quality.

For real time communications like VoIP, codecs need to process audio in real time, so it only has 20 milliseconds to encode or decode 20 milliseconds of audio. By comparison, Codecs such as MP3 don't have to encode audio in real time so they achieve better compression and audio quality.

Unfortunately, current digital radio protocols and standards do not specify widely-implemented or freely-available Codecs (even those that use RTP and SIP).

One solution is to continue to use gateways that are designed to transmit the added digital radio data and functionality. This approach provides additional benefits:

- radios with Point-to-Point protocols can be shared amongst a number of operator positions,
- only one vocoder (located in the gateway) is required, shared amongst a number of users,
- radios can be accessed simultaneously by different dispatch consoles,
- gateways provide flexibility to change protocols to meet future demands.

The above is an extract from the Omnitronics White Paper 'Understanding RoIP Networks'. This white paper delves further into the above considerations and also discusses and compares the range of IP Connectivity methods organizations can choose from to best suit their needs.

For further information, go to www.taitradio.com

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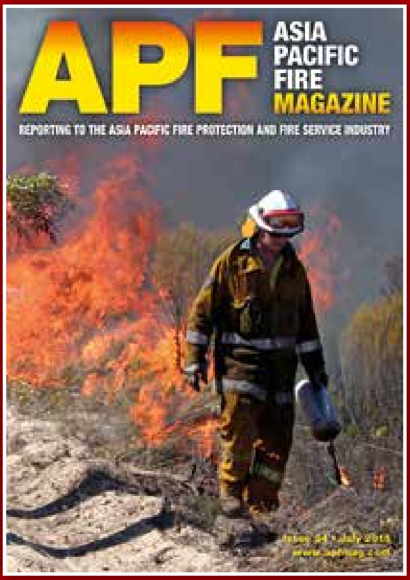
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AFAC '15	**61**
Bauer Compressors Asia Pte Ltd.	**85**
Bio-Ex S.A.S	**79**
Bristol Uniforms Ltd.	**37**
Bullard Asia Pacific	**91**
China Fire 2015	**43**
Codan Radio Communications Division	**38**
Coltri Asia Pacific Co Ltd.	**59**
Cutters Edge	**92**
Dafo Fomtec AB	**63**
Dr. Sthamer Hamburg	**77**
DuPont Fire Extinguishants	**IBC**
Dynax Corporation	**04**
E2S	**41**
Exova Warringtonfire Aus Pty Ltd.	**21**
Fike Corporation	**21**
FFE	**25**
Fire Protection Association Australia	**24**
Firetrace International	**29**
G H Varley Pty Limited	**51**
Gielle Group	**74**
Hainsworth	**59**
HD Fire Protect Pvt Ltd	**107**
Holmatro Rescue Equipment	**82**
Kidde Australia	**61**
Kochek Company Inc.	**78**
Leader S.A.S	**85**
LHD Group Hong Kong Ltd.	**49**
MSA – The Safety Company	**46**
Pacific Helmets (NZ) Ltd.	**87**
PAB Akrapovic	**99**
Packexe Ltd.	**17**
Patterson Pump Company	**02**
Pentair Pumps	**22**
Performance Advantage Company	**35**
Reliable Fire Sprinkler (UK) Ltd.	**103**
Rosenbauer International AG	**68**
Safety Equipment Australia Pty Ltd.	**55**
Saphire Complete Training Concepts	**107**
Sicor S.p.A.	**65**
Solberg Company	**53**
Specified Technologies Inc.	**56-57**
Task Force Tips, Inc.	**IFC / 01**
Teikoku I-Sen Co.	**73**
Tempest Technology Corporation	**71**
TenCate Protective Fabrics	**06**
Texas A & M Emergency Services Training Institute	**38**
TLX Technologies	**41**
Tyco Fire Protection Products	**OBC & 32**
Yone Corporation	**89**
Ziamatic Corporation	**51**

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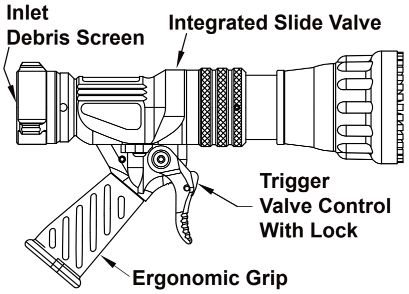

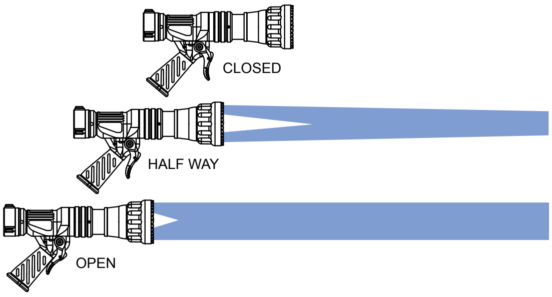

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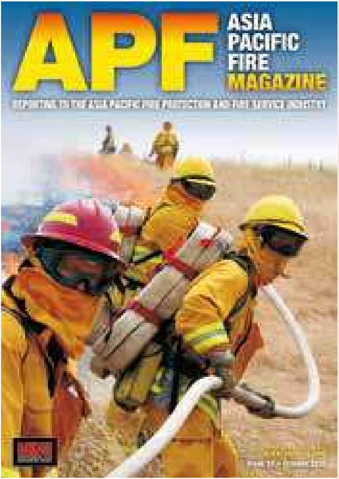
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OCTOBER 2015 • ISSUE 55

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Contents

OCTOBER 2015

REGULARS

5 Editors Comment

7 CFPA-Asia Comment

9 Industry Comment

10 News and Profiles

76 Buyer's Guide
PPV Equipment

FEATURES

33 Finding Situation Awareness

37 Should the Fire Industry Compromise on Touchscreen Technology?

40 Developing Standards in the Asia-Pacific Region

43 Investing In Your Protection and Protecting Your Investment

51 Not all PPE is Born Equal!

55 Risk Reduction Gulf: The two sides of Earthquake Disasters

59 Applying Science and Technology for Disaster Risk Reduction

62 First International Wild Fire Conference held in Asia

72 Positive Pressure Attack – The Rules of Engagement

81 Thermal Imagers – Seeing through the Smoke

85 Imagine a Place Where Every Disaster Scenario Really Happens... Krizo

89 The Story of ADPC: Holding a Mirror to Disaster Risk Reduction in Asia

92 Are Field Based Incident Management Systems the Death of Radio?

96 Advertisers' Index

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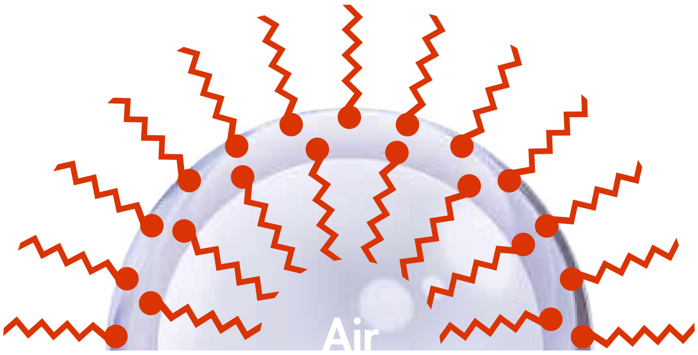

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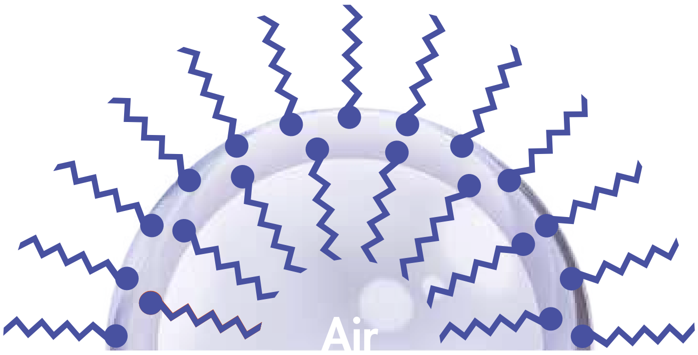

Fluorinated foam bubble

AFFF Foam **repels** hydrocarbon fuels

Fluorosurfactant
(Fluorocarbon tails are fuel-hating)

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Unsung Heroes in Fire Safety

Often we don't sit back and think about our industry, what journey have we been on to be where we are today? I scan through this magazine and look at all the new high tech equipment now available to fire fighters, the public and for building fire protection and I wonder who the unsung heroes are that thought of, researched, developed and trialled all this high tech gear.

Neil Bibby
AFSM, FAICD, MIFireE
Editor

Don't let anyone tell you that the good old days were a time to be rejoiced. When I was a young fire fighter in the 1970s our uniforms didn't protect us, our helmets were flimsy and even the hose branches we used had no controls, they were also less effective than today's. I could go on and compare ladders, breathing apparatus, rescue tools etc. then and now, but I don't have the space. Building protection in the 70s was mainly designed around passive protection and domestic smoke alarms (if you could find a supplier) cost $280 in today's dollar terms, they were also less effective. Sprinkler systems were designed mainly for asset protection unlike the fast response life safety heads of today, alarm systems were a simple open and closed circuit unlike the addressable ones now in use.

Who are these people that have innovated, who improve on the existing hardware, develop new tools and products to make fire fighters and civilian's lives safer as well as protecting our homes and national infrastructure?

I know there is a commercial element in all of this but the fire/emergency industries, in my view, innovate way above their weight. More importantly each of these innovations assist society whether it be life safety, asset or business protection.

There are two groups that we should recognise, the first being the corporates who develop their own in-house innovations, either from first principles or adopting and adapting technology from other industry sectors completely different to ours. USAR tools are a good example of this, a large number of the tools being used now come from the mining industry, and another one that stands out is the lighting systems used in rescue that originated in the film industry.

The second group are those individuals that not only have a good idea and develop them themselves, they set up new businesses to market a product that the customers don't even realise they need. This is the hard way to do it but they are there by the hundreds – just look at the number of social media applications now being offered to agencies and the public.

Do a simple test, read all the advertisements in this edition not to look at the product but to look at the innovation that has taken place over the past two decades with each product and if it wasn't there twenty years ago think about who came up with the idea and be proud of our industry.

Do the users of all these improvements, fire agencies, building owners, engineers, the public etc. appreciate all the innovation with its proven benefits or is it like the frog not noticing the water is getting hotter when the water is being heated slowly?

These innovators save lives and have been saving lives for years. Isn't it time we started recognising them not just through small industry awards that only their peers see but on the international stage. Give me your thoughts and ideas neil.bibby@mdmpublishing.com. Think about it. The equivalent of the Nobel Prize for Fire Safety (is this too much to ask for).

Who are these people that have innovated, who improve on the existing hardware, develop new tools and products to make fire fighters and civilian's lives safer as well as protecting our homes and national infrastructure?

Neil can be contacted at
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The Confederation of Fire Protection Associations – Asia

The Confederation of Fire Protection Associations – Asia (CFPA-Asia), represents fire protection organizations from the Asia Pacific Region. By sharing experience, research, technical know-how, and fire statistics, the group aims to maximize the effectiveness of fire prevention and protection and foster improved international fire safety codes and standards.

Rob Llewellyn

CFPA-Asia Chairman

CFPA-Asia operates under By-Laws developed in 2005 and updated in June 2014. This update also introduced new levels of membership.

Three levels of membership are available for organizational entities; Member, Affiliate and Associate.

Member status is for an association, whose primary objective is to address fire safety and associated matters.

Affiliate membership is granted to a person representing an agency, association or institution with an objective to address fire or life safety.

Associate membership is for a person, firm, company, business or organization with an interest in fire or life safety, fire protection, fire suppression or fire prevention, including those involved in the manufacture and supply of fire or life safety products, equipment and services.

CFPA-Asia brings together Fire Protection Associations of Asia Pacific countries to promote the awareness in relation to fire prevention and protection within the Region, exchange information relating to fire prevention and protection and publish policy and position statements to make public the official beliefs and recommendations of the Association. To this end, CFPA-Asia has published four documents, Smoke Alarms, Maintenance of Fire Safety Systems, Locking of Exit Doors and Climate Change.

Another offering by CFPA-Asia for Member Countries, Affiliate members or Organisations in the Region is CFPA-Asia Task Forces. These may be established to assist in the more challenging fire safety matters including regulatory matters, standards development, fire investigation, and other fire safety issues requiring assistance. Task Forces may also be established to assist with the conduct of seminars and conferences.

Recently CFPA-Asia helped establish the Association of South East Asia Nations (ASEAN) Fire Chief Council, the purpose of which is to maintain relations between fire chiefs in the region which will include sharing and cooperation in the fire and rescue fields. Membership includes Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. CFPA-Asia will be helping to run education seminars and conferences in these and other regional countries and to also to provide opportunities to implement new practices such as Fire Protection Association Australia's Fire Protection Accreditation Scheme (FPAS) which was launched in July 2013, as a nationally harmonised accreditation system designed to recognise the skills and competencies of individuals working in the fire protection field. FPAS Australia covers the 'Inspect and Test', Design and Certify classes of work.

From the initial meeting held in Hong Kong in 2003 CFPA-Asia has now grown into a strong group of 13 nations and 25 members. Plans are underway to expand the membership base to include fire protection organizations from Countries generally recognized by the United Nations Economic and Social Commission for Asia and the Pacific and the Arabian Peninsula fire protection organizations.

The General Assembly Meeting held in May of 2015 welcomed The Building Safety and Officers Association of Thailand and MDM Publishing Ltd publishers of Asia Pacific Fire Magazine as members.

The Executive will be meeting in October to plan 2016 activities and membership growth. They will also be considering training and education arrangements and the development of further policy and position statements covering combustible facades and product approvals at importation stages.

For more information, go to www.cfpaa.com

▼ CFPA-Asia executive members left to right Peter Petrus Indonesia, Steven Ooi Malaysia, Joe J K Kwok China/HongKong.

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The Tipping Point – Positive Changes Necessary to Restore Confidence

In *The Prince* Machiavelli wrote: “There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of things”.

Scott Williams

FPA Australia CEO

Never has this been truer than in the current Australian fire protection landscape at the moment. And yet, despite the challenges and the detractors, our industry now stands poised at the tipping point of some of the most significant change in our history. The core driver of these changes is an acknowledgement at all levels of community and government that in a modern, innovative and developed nation, matters of fire safety must not be left to chance.

It has become clear in recent times and due to several high profile events, that community expectations about fire safety are not necessarily matched by the existing regulatory frameworks and industry self-regulation.

There is, for example, a community expectation that individuals who conduct work on lifesaving fire protection systems and equipment will be trained and competent. Unfortunately in Australia this is often not the case. Additionally, as a community we have an expectation that buildings will be constructed and approved to appropriate minimum levels of fire safety in accordance with relevant legislation. Again, recent events indicate that reality falls well short of expectation in this regard.

As the depth of the void between the current state of the industry and community expectations have become clearer, Fire Protection Association Australia has sought to take our members and our industry forward to restore confidence and to shape our own destiny, before a major fire event leads to regulation being forced upon us that might not be ideally suitable.

At its most basic level, this vision for a future safe from fire is made up of two critical components: competent personnel (fit-for-action) and products (fit-for-purpose).

People:

For well over a decade, Association members, regulators and the community have been calling for professional recognition / accreditation for the fire protection industry. This is because, despite the potential impact on life safety when things go wrong, the majority of fire protection activities in Australia are unlicensed. In 2013, without government funding or any other external support, and with reluctance from some corners of the industry FPA Australia launched the Fire Protection Accreditation Scheme (FPAS).

The scheme, which was introduced with the ‘Inspect and Test Category of work and now also covers Fire Systems Design and Fire Systems Certification, represents a first. The scheme is costly and resource intensive and we have had to be brave enough to invest in it, knowing that professional recognition is the only way forward for our industry. We now have almost 1000 accredited individuals and, more than ever, we are certain that the success of FPAS is fundamentally linked with the success of our industry.

Products:

It may seem remarkable that the issue of non-conforming products and fire safety has become such a hot topic in mainstream media in recent times, but this level of public interest is a direct reflection of the growing public unease with the performance of Australian building and construction generally.

Incidents such as the Australian Competition and Consumer Commission recall of Infinity Electrical Cable, which can become a fire hazard in as little as two years and was installed in up to 40,000 homes Australia wide, have eroded confidence in the power of existing regulatory regimes to ensure compliance. Add to this the significant fire at the Lacrosse apartment in Melbourne’s docklands precinct, which was fueled by highly flammable non-compliant cladding installed on the exterior of the building, and it is understandable that the public and the media, have realised that something is wrong.

This publicity combined with strong advocacy undertaken by FPA Australia and other industry groups has recently yielded a significant breakthrough with a meeting of federal and state building minsters agreeing to a plan of action on non-conforming products. At the same time, an enquiry by the federal Senate has been launched into non-compliant building products. (Read more about this in our article in this issue of Asia Pacific fire.)

Our 2020 Vision:

Despite the immense challenges of driving positive change, it is clear that change has arrived and more is needed. We have reached the necessary tipping point and as an Association we have a clear strategy for the future.

By January 1 2020, our vision is that all FPA Australia members who conduct work in a category where FPAS exists will employ accredited staff and will be recognised as a professional company committed to training and continuing professional development. At the same time, by 2020 our goal is to see all products that present a risk to life safety due to fire undergo appropriate testing and certification, and then be listed on a comprehensive listing scheme.

We have less than five years to achieve our goal, but I am optimistic about the future. Through high-profile incidents, the community has demanded that we raise the bar for what is an acceptable level of fire risk posed by people and products in the fire protection industry. We are committed to meeting and exceeding their expectations, despite the challenges.

We must do this, in order to restore trust and to ensure the future of our industry. But most importantly, we must do it to achieve the overall vision of our Association – To lead and support a professional industry to minimise the impact of fire on life, property and the environment, for a safer community.

News

Tempest's New Line-Up of SHADOW™ Smoke Machines

Image courtesy of Tempest

Towards the end of 2014, Tempest Technology Corporation unveiled its new line-up of SHADOWTM brand Smoke Machines: The SHADOWTM Dusk, Nightfall and Blackout.

Boasting updated designs and numerous new features, the new trio replaces and expands upon Tempest's previous line of smoke machines, which have been serving the fire industry for nearly a decade. Equipped to fulfill a wide range of needs and uses, the Dusk, Nightfall and Blackout are unique from one another in both features and performance.

"Our new line of SHADOWTM smoke machines elevate functionality, performance and ease of use to new levels, allowing them to serve in a full range of training simulations, from small to extremely large output needs," notes Johan Gidstedt, President of Tempest. "Some of our new exclusive features, such as the built-in air cleaning system, makes the SHADOWTM line arguably the most convenient to care for and maintain as well."

The SHADOWTM Dusk replaces Tempest's previous Shadow smoke machine, and is built for high smoke output while still being the most economical in the line-up. The Nightfall, which replaces its predecessor, the Shadow 1, is designed to provide the perfect balance in high performance, cost and additional features. The Blackout is an all new addition in itself and delivers the highest smoke output of the three, perfect for large scale training and simulation needs. Both the Nightfall and Blackout come equipped with Tempest's exclusive air-input connection to allow rapid cleaning via bottled air after every use.

For more information on the new SHADOWTM Smoke Machines, or any of Tempest Technology Corp.'s products and service, you can visit their website or reach them at +1 800 346 2143 or response@tempest.us.com.

For more information, go to www.tempest.us.com

New Fire Protection Nozzles from Spray Nozzle Engineering

As exclusive Bete partner in Australia, New Zealand and the Pacific Rim, Spray Nozzle Engineering is pleased to announce the addition of a new expanded range of fire protection nozzles for special hazard fire suppression systems.

On the back of the successful N series spiral nozzles installed for fire protection and fixed suppression in marine, offshore, and tunnels locally and internationally, Spray Nozzle Engineering's fire protection nozzle range now includes Bete's new AFF fire protection spray nozzles.

The FM-approved, flat fan AFF nozzles can be employed in water wall applications where water is used as a barrier to provide a protective shield against radiant heat, harmful gases, and flames, and in water deluge applications for surface or equipment protection when relying on rundown.

Spray Nozzle Engineering have a long history in special fire protection applications, having supplied the FM-approved N-Series spiral nozzles for many road tunnel Fixed Fire-Fighting Systems (FFFS). Noted installations include the successful deployment of the N series spiral nozzles in the 2007 Burnley tunnel fire, contributing to minimal infrastructure damage and the rapid reopening of the tunnel.

They have also developed patented vehicle fire protection nozzles. The BM Foil nozzles incorporate a foil cover orifice protection system, designed to provide consistent spray distribution and fire suppression performance. The BM Foil is perfect for high heat and dust susceptible environments and is an optimal foam fire protection in mining, farming, forestry and other applications where nozzle orifices require protection.

For more information, go to www.spraynozzle.com.au

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FROM SPRAY NOZZLE ENGINEERING

Image courtesy of Spray Nozzle Engineering

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Holmatro Launches the 5th Generation of Cutters

Lighter and more ergonomic than ever, without any concessions on performance: Holmatro introduces the first two models of its new 5000 series cutters. The most important factors in the development of these cutters were weight reduction and improved ergonomics, while maintaining an optimal cutting performance on modern cars. This has been achieved through a combination of new materials, component integration and innovative design. Being much lighter than the previous generation, the new 5000 series cutters significantly reduce the physical burden on the operator. This burden is even further reduced by one special model, the Inclined Cutter. Both models are also available with Greenline battery technology for increased freedom of movement.

Inclined Cutter CU 5050 i

Designed for more ergonomic cutting high and low on the car, this cutter with its inclined jaw eliminates the need to lift the tool high up for a roof cut or to bend over deeply to cut the rocker panel. Working with the Inclined Cutter also means there's more space for the tool to move towards the car when you cut a pillar from the side. And with the carrying handle going all-around, you can always use this cutter in its most favorable position, at all sides of the vehicle. The CU 5050 i too has been tested extensively on the latest prototypes.

Optimal performance on modern cars

The models currently introduced (CU 5050 and CU 5050 i) are New Car Technology cutters, offering an optimal cutting performance on modern vehicles. Contributing features are:

- New Car Technology (NCT) blades. These U-shaped blades can surround wide pillars and automatically pull the material into the cutting recess, close to the central bolt, where it is cut at the strongest point of the tool.
- Optimized cutting edge. We've further optimized the cutting edge of our NCT blades for a longer blade life and the best possible performance on modern cars.
- The i-Bolt. This flat central bolt construction squeezes the blades together directly (no blade holder in between!) and more tightly. This results in a better cutting performance.
  It also gives you the advantage of better access into narrow spaces.

© Image courtesy of Holmatro

Other features and benefits

- Ergonomic carrying handle increasing operator comfort in various working positions.
- Six LED lights with a high light output integrated in the carrying handle.
- Patented CORE Technology combining oil feed and return in one hose to make rescue operations safer, quicker and easier.
- On battery powered models: Greenline battery technology combining a long battery life with high capacity for maximum operational use.

For more information, go to holmatro.com/en/cutters

Fire Protection Technologies Expands into South East Asia

In April 2015 Fire Protection Technologies officially opened the new South East Asia Regional Office in Singapore.

As part of the expansion into South East Asia, Chris Trapnell, previously Fire Detection Product Manager in Australia, has moved to Singapore to head up the team and further capitalise on the opportunities within the region.

Fire Protection Technologies has a range of quality special hazard fire protection products and systems in stock, ready for delivery, Including Gaseous suppression systems from Safety Hi Tech, NAF S 125 and NAF S 227 and Sevo, NOVEC1230, Linear heat detection products, thermal detection cameras, foam concentrates and much more…

About Fire Protection Technologies

Fire Protection Technologies is the leading independent supplier of product, design and engineering services in Australia, New Zealand and Asia Pacific. A specialist fire protection company focused on the protection of unique and special hazard applications and fire risks. With our extensive expertise in providing design and engineering solutions we strive to provide the right solution for any given hazard.

For more information about the Singapore office call +65 6635 7060 or visit www.fire-protection.com.sg. To learn more about Fire Protection Technologies Australian products and services visit our website or call 1300 742 296.

For more information, go to www.fire-protection.com.au

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E2S Warning Signals Launches two New Product Families at ADIPEC 2015

ADIPEC, Abu Dhabi, is a premier global show for the oil and gas industry and certainly the most important platform in the Middle East. E2S Warning Signals, the UK based independent audible and visual warning device manufacturer, has exhibited at the show for many years. At this year event on Stand 8320 in the UK Pavilion E2S is launching two brand new families of alarm horn sounders and light strobes and introducing two ranges launched earlier in 2015. The stand focuses on explosion proof and intrinsically safe warning signals developed to meet the challenging needs of the offshore and onshore oil and gas industry.

Image courtesy of E2S

The centrepiece of the stand is a preview of the new premium 'STEx' stainless steel enclosure explosion proof warning signal range, which offers outstanding corrosion resistance in aggressive environments combined with outstanding performance. Also on show is the new 'D1x' range, intended for Class I and Class II Division 1 and Zone 1 & 20 applications. The strobe units are available in seven colours with a UV stable polycarbonate, field replaceable filter; the alarm horns with either traditional flared horns or a unique omni-directional compact radial horn. A threaded flame path enables quick installation and simplifies maintenance inspection and the innovative internal arrangement maximises wiring space.

Also on display are the 'D2x' and 'E2x' alarm horns and combination signals approved to UL, cULs, ATEX & IECEx Div 2 and Zone 2 alongside the industry standard 'BEx' explosion proof and the 'IS-mini' intrinsically safe product ranges.

Sales and Marketing Director Neal Porter will be at the stand together with other staff from the London head office to answer questions and talk about the new product releases, including the new line of stainless steel body devices.

For more information, go to www.e2s.com

The Future of Fire Detection is About Having the Right PROFILE

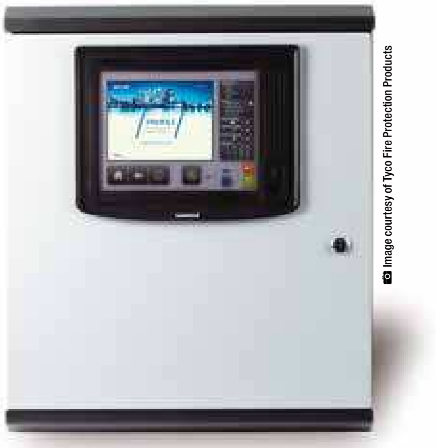
Image courtesy of Tyco Fire Protection Products

Tyco Fire Protection Products, a Tyco business, is launching the new ZETTLER PROFILE fire detection control panel range to meet a variety of market demands in the Asia Pacific Region. Aesthetically designed to blend into any environment, from luxury hotels to schools, universities, hospitals and commercial multi-story offices, the PROFILE touch-screen user interface allows access to any part of the menu in only three easy steps. The detection system can help improve efficiencies, reduce lifetime costs and fundamentally ensure the highest enhanced levels of fire safety. System owners and users who require to access and manage the programming software can now do so with a user-friendly version of the configuration tool.

The ZETTLER PROFILE is a new way of interfacing and managing all aspects of the renowned MZX Technology® digital addressable system. The new panel is totally backward compatible with the existing MZX range, all of which can fully interface with the older legacy Minerva range. Upgrading existing systems becomes easier with reduction in time and installation costs. The system can also be updated in line with future advances in fire detection technology and can be easily expanded, allowing a capacity of up to 2,000 addressable devices per panel and up to 99 panels per network.

The ZETTLER PROFILE range of control panels will be available from one to eight loops. The system can also be managed via a remote user interface, an 8-inch colour touchscreen with multi-lingual options. Up to 8 user interfaces can be used per panel. The contemporary and discreet touchscreens have been designed with a fully customisable home screen, and can be branded in-line with the building's corporate identity.

Simple to install, configure and service, ZETTLER PROFILE allows users to log on using the latest Radio Frequency Identification Technology (RFID) for fast and secure identification instead of a traditional key. Engineers can configure the system with the required cause and effect programming, leaving the building occupier with the software necessary for the day-to-day management of the system.

Besides VdS, EN54.13, EN54.2 and EN54.4 European approvals, PROFILE has also been approved by Singapore TUV – PSB: EN54 and Singapore Code of Practice: SS CP10:2005.

For more information, go to www.zettlerfire.com

Oshkosh Announces Enhancements to its Snozzle High-Reach Turret

Oshkosh Airport Products, LLC, an Oshkosh Corporation company, announced that its Oshkosh Snozzle® high-reach extendable turret (HRET) is now equipped with several enhancements. Renowned for its ability to keep firefighters further away from danger, the Oshkosh Snozzle HRET's new features improve performance, ergonomics, and serviceability.

▶ Renowned for its ability to keep firefighters further away from danger, the Oshkosh Snozzle HRET's new features improve performance, ergonomics, and serviceability.

Image courtesy of Oshkosh

"The Oshkosh Snozzle HRET is a game-changing firefighting technology that has proven its mettle with firefighting forces on four continents and at many of the world's largest airports. Now, with its all-new electronics software package, the entire new system has been integrated into the Striker ARFF line," said Jeff Resch, Oshkosh Airport Products vice president and general manager. "Plus, we've incorporated several hardware and software design upgrades that result in smoother operation, easier troubleshooting and enhanced reliability."

Available on the Oshkosh Striker vehicle's full range of 4 X 4, 6 X 6 and 8 X 8 models, the Snozzle HRET features 50-or 65-foot lengths and can be equipped with a penetrating nozzle, and color or forward-looking infrared cameras that enable firefighters to discharge from 1.5 meters (5 feet) below grade to elevations as high as 19.8 meters (65 feet).

The electronic control system is now integrated into the chassis Controller Area Network (CAN bus) for enhanced troubleshooting, easier servicing and enhanced reliability. The hardened carbide steel tip features an updated hydraulic rotary actuator, an increase range of motion (up to 280°), longer piercing depth and a decreased overall width for better visibility. Inside the cab, a new control module feature simplifies operator controls and provides smoother operation.

"We are the world's leading producer of HRETs, and have close to 100 units in service," added Resch. "This portfolio of upgrades demonstrates our commitment to keep the Oshkosh Snozzle at the leading edge of firefighting technology."

For more information, go to slowe@airport.oshkoshcorp.com

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Teijin begins Production of Teijinconex® neo

Teijin Corporation (Thailand) Limited, a wholly owned subsidiary of Teijin Limited, announced today that it has begun producing Teijinconex® neo, a new type of highly heat-resistant and dyeable meta-aramid fiber, on the premises of Teijin (Thailand) Limited in Bang Pa-in Industrial Estate, Ayutthaya, Thailand. Teijin is now the first company to ever to produce high-function, high-performance fibers in the ASEAN region.

The 2,200-tons-per-annum plant was built at a cost of around JPY 4.5 billion (USD 36 million) and has begun operating with a workforce of 70 people. The site measures 22,985 square meters. Construction of the plant started in December 2013.

Teijinconex® neo offers unsurpassed heat resistance and excellent dyeability that enable highly diversified solutions for the design and manufacture of protective apparel. Teijin's production technologies assure that products are compliant with REACH and other environmental regulations directly out of the factory, without additional treatment.

Teijinconex® neo will strengthen Teijin's position and competitiveness in the emerging markets of Asia and other regions, where the demand for heat-resistant, flame-retardant high-performance materials is growing. Teijin expects to take a leading position in the global market for protective apparel, targeting sales of JPY 20 billion (USD 160 million) by 2020.

"Teijin first began operating in Thailand in 1966 and now has seven group companies with 1,500 employees," says Tadashi Sakata, President of Teijin Corporation (Thailand). "We are also expanding our automotive rubber materials business in Thailand and are shifting polyester fibers production to this market from Japan. Going forward, we will upgrade our production and processing capabilities for high-performance fibers by steadily introducing advanced technologies in Thailand, the hub of the ASEAN region."

Image courtesy of Teijin

Teijin's Teijinconex® meta-aramid fiber, Twaron® and Technora® para-aramid fibers, Pyromex® flame-resistant fiber and Endumax® high-performance polyethylene have made significant contributions to the advancement of protective apparel over the decades. Today, strong demands exist in developed markets for protective clothing made with aramid fibers offering comfort, maneuverability and excellent dyeability, as well as high protection. In Asia and other emerging countries, rising standards for protective apparel are boosting the demand for Teijinconex® and Teijinconex® neo meta-aramid fibers in these markets as well.

For more information, go to pr@teijin.co.jp

BULLETBLADE® from Cutters Edge

Thousands of Fire Departments have been using the BULLET® Chain on Fire Rescue Chainsaws for over 25 years, and now Cutters Edge has developed a method to attach a BULLET® Chain to a rotary saw circular blade. The rotary saw turns the blade up to 3 times faster than a chainsaw, significantly increasing the performance and the range of materials it can cut.

Image courtesy of Cutters Edge

The new carbide-tipped BULLETBLADE® will cut any material that any other carbide-tipped blade can cut …and more! But, what really sets the BULLETBLADE® apart is that it can be sharpened and repaired! Individual cutters, or even the entire chain, can be replaced when carbides are broken, so you don't need to buy a new blade!

The BULLETBLADE® is capable of cutting most building materials including high-rise, hurricane and bulletproof glass. The BULLETBLADE® is an effective tool for Ventilation, Forcible Entry, RIT, Search and Rescue, Extrication and More.

- Cutters Move 3 Times Faster Than A Chainsaw
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- Minimal Spark Generation
- Always maintains Size and Shape
- The BULLETBLADE® can Be Sharpened, Cutters can be Replaced or Repaired and The Blade Core Can Be Used Repeatedly For A True Cost Savings.
- Replacement Bullet® Chain, Chain Repair Parts, Sharpening And Repair Tools Are Available For Departments With Multiple Saws, And In-Field Repair At Extended Incidents Such As Major Catastrophes And Other USAR/FEMA Type Events.

Application

For Gasoline Powered Hand-Held Rotary Rescue Saws. Recommended for use on saws 5 hp (3.7kW) and above.

*Available in 12", 14" and 16" Sizes with Arbor Size to fit all other brands.

For more information, go to www.cuttersedge.com

Advanced wins ESX 2015 Innovation Award for PerfectSync

Global fire systems business Advanced has won a Fire and Life Safety Innovation Award for its PerfectSync emergency communications system at the 2015 ESX Show in Baltimore, USA. The awards recognise industry products for their innovative design, as well as how well the product helps security and life safety professionals maximise their businesses.

PerfectSync automatically synchronizes audio, voice and strobe signals across Advanced's Axis AX fire alarm networks dynamically, as conditions change. Synchronization of audio and visual signals across multiple notification zones, floors and areas, prevents confusion in an emergency situation and aids in meeting intelligibility standards.

PerfectSync uses high performance, distributed, digital amplifiers that come standard with an integral backup amplifier and power source, while supporting up to 16 messages. Messages can be easily programmed from a library or created manually. Activation and control of messages can be automatic or manual. Live notifications/paging can be delivered through microphones or fire wardens' telephones. Upon completion of paging, recorded messages will restart, playing the full message from the beginning.

PerfectSync ensures that all audio messages and strobes are fully synchronized without the need for special wiring or programming. Should a fire spread to an adjacent floor or area, audio and visual indicators come on immediately, and the audio messages will quickly synchronize with any identical audio message on the system.

Mike Troiano, President and CEO of Advanced in the USA, comments: "I'd like to thank all of the engineered system distributors, engineering and consulting firms, AHJs and regulatory officials from all across the country that contributed to the specifications that drove the design of PerfectSync. The end result is a technologically advanced, easy to use audio and visual communications system that improves life safety for all of the occupants of a building in an emergency situation."

For more information, go to uk.advancedco.com

Image courtesy of Advanced

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Tyco Fire Protection Products

Taking Restaurant Fire Suppression Systems to New Heights

Tyco Fire Protection Products (TFPP), a global leader in total fire suppression solutions, recently introduced increased nozzle heights for its ANSUL PIRANHA Restaurant Fire Suppression Systems. Featuring a UL 300 certified design, this new enhancement enables agent discharge nozzles to be installed at increased heights up to 84 inches (2133 mm) from the top of the hazard zone while providing the reliable protection commercial kitchens need in today's environment.

With nozzles installed out of view, restaurant owners and managers eliminate the need for visible drop piping. Along with enhancing kitchen aesthetics, increased heights reduce the potential for grease accumulation around the nozzle and simplify hood cleaning and service, minimizing downtime and cost. Nozzle redirection is a reality in today's kitchens and can be potentially hazardous to staff. It is important to reduce the potential for intentional or inadvertent nozzle redirection and obstruction.

▶ ANSUL PIRANHA Restaurant Fire Suppression Systems are designed to cool up to 15 times faster than conventional single-agent systems.

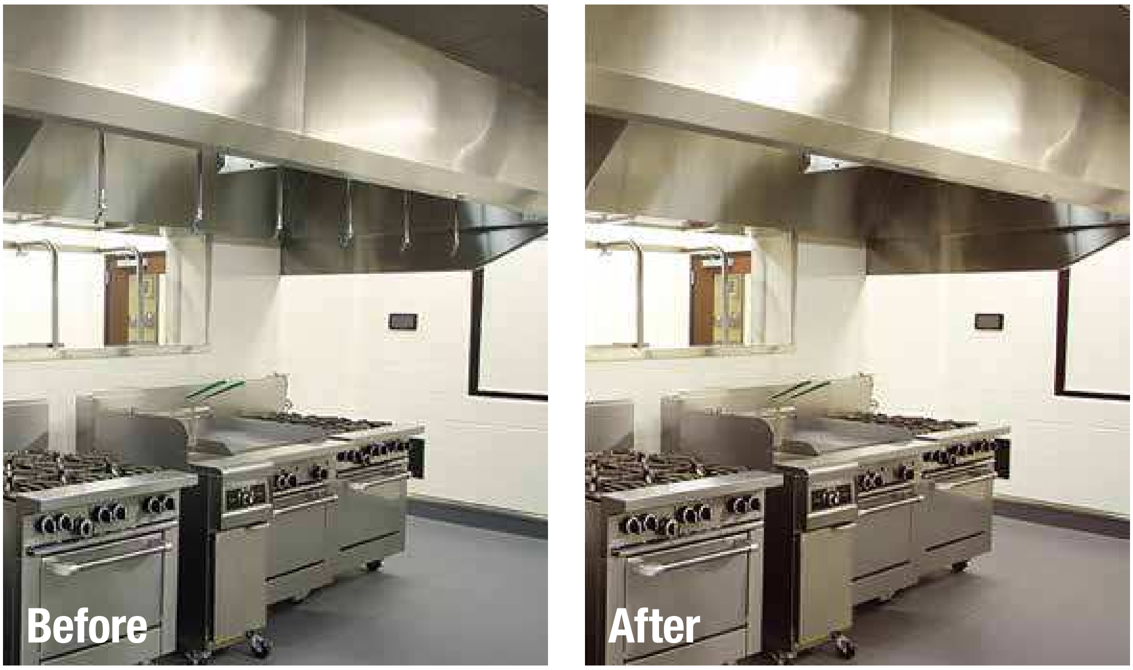
Images courtesy of Tyco Fire Protection Products

"Customer and employee safety is always our No. 1 goal," said Mark Neumann, Director Pre-Engineered Systems, Tyco Fire Protection Products. "With that said, we constantly look for ways to improve aesthetics without sacrificing fire protection effectiveness for restaurant owners looking to create a unique dining experience. The trend of exhibition kitchens is on the rise, making the appearance of a commercial kitchen more important than ever. By keeping nozzles out of view, restaurant management can create a better dining experience for customers."

"It's not as easy as just increasing the nozzle heights – you also have to test them," said Neumann. "We have been diligent with performance testing nozzles to help ensure spray patterns have been adjusted for maximum effectiveness at increased heights."

PIRANHA systems are designed to cool up to 15 times faster than conventional single-agent systems and use 60 percent less agent. This superior system offers flexible overlapping nozzle coverage, maintaining rapid flame knockdown and securement.

For more information, go to www.ansul.com/increasedheights



◀ Protection Above the Rest: The new UL listed nozzle design allows appliance protection nozzles to be installed up to 84 in. (2133 mm) above the cooking hazard.

Introducing the latest title from

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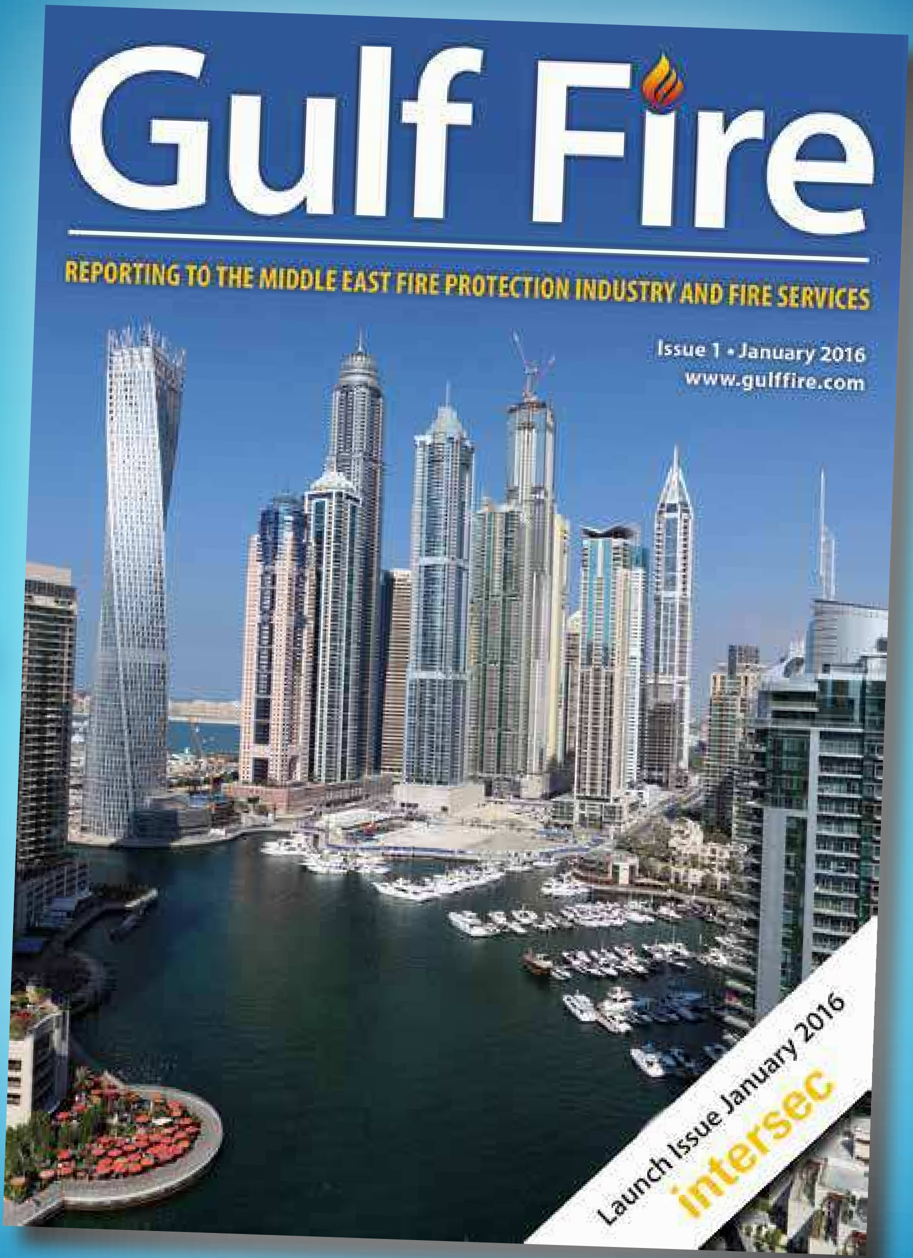
Gulf Fire Magazine is set to become the only quarterly journal specific to the Middle East fire market dedicated to both fire protection and firefighting, which will circulate to an initial readership of over 8,000 industry professionals. The editorial features will be written by industry experts and comprise a unique blend focussing on the latest technology, training methods and equipment as well as highlighting sector specific issues from around the region. Regular product and company profiles, events updates and news will make Gulf Fire Magazine the first choice read for fire protection and firefighting professionals.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Husqvarna DXR

New Package set-up for Increased Precision, Performance and Protection

The brand new DXR set-up consists of three packages; the Additional Feature Package, the Enhanced Cooling Package and the Heat Protection Package. All three packages provide increased precision, performance and protection in demolition work of all kinds – especially in high ambient and radiant temperatures.

The first package – the Additional Feature Package – allows the user to control one extra hydraulic function precisely, such as axial rotation of grapplers and shearer. The user also has access to additional tools like vertical mills. Cylinder protection is included in the additional feature package to protect against bumps and blows.

Full power at 55°C

The Cooling Package holds the same features as the Additional Feature Packag e, but also contains a cooling kit. The Cooling Package is compatible with DXR 2/300 series and can work continuously with full power on work sites where the ambient temperature (convection heat) is up to 55°C, which enable s higher productivity and efficiency.

"Traditionally, when working in high temperatures, you are somewhat restricted if you want to keep full power and load throughout the job. With the new Cooling Package you save both time and money and can stay on full power the whole time", says Lars Gustafsson.

For example, the Cooling Package works excellent when removing dross in steel works – a place where the ambient temperature always is high.

Deals with radiation heat

The third package in the set-up, the Heat Protection Package, can be used on DXR 270, DXR 300 and DXR 310. It holds all the benefits of the Cooling Package and the Additional Feature Package, but also contains steel tracks, steel feet, heat protected hydraulic hoses, special hydraulic oil, fire-resistant oil and compressed air hose to breaker. It protects vital parts from damage caused by both radiant heating and conduction heating. If you want to work efficiently with DXR in process industry and kilns with high radiation and convection heat – the Heat Protec-tion Package is the choice for you.

"The steel details are added to cope with heat – and makes it possible to operate the machine in high radiation heat in front of the machine in an efficient way", says Lars Gustafsson.

◀ **The second package holds all the benefits from the Additional Feature Package, but also enables full power in high ambient temperatures.**

Image courtesy of Husqvarna

Additional Feature Package

- Enables the user to control one extra hydraulic function, such as axial rotation of grapplers and shearer.
- Contains: cylinder protection C2–C3, one extra hydraulic function.
- Works with all Husqvarna DXR machines.

Cooling Package

- Enables work with full power in high ambient temperatures (up to 55°C).
- Contains: the features from the Additional Feature Package, compressed air-cooler.
- Works with Husqvarna DXR 2/300 series.

Heat Protection Package

- Enables work in process industry and in kilns with high radiation and convection heat.
- Contains: the features from the Additional Feature Package and the Cooling Package, steel tracks, steel feet, heat protected hydraulic hoses, special hydraulic oil and compressed air hose to breaker.
- Works with Husqvarna DXR 270, DXR 300 and DXR 310.

All three packages can be bought with a new DXR machine directly from the factory. Installing these packages in the clean factory environment saves time and money. The included components are also available for aftermarket installation, but the packages differ when ordering for aftermarket.

For more information, go to www.husqvarna.com

Find out more!
Scan the QR-tag
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Husqvarna

HUSQVARNA DXR 310
22 kW, 2020 kg, reach 5.5 / 5.2 m up.
Modular, digital CAN-based PLC.

HUSQVARNA DXR 300
22 kW, 1960 kg, reach 5.5 / 5.1 m up.
Modular, digital CAN-based PLC.

HUSQVARNA DXR 140
15 kW, 985 kg, reach 4.4 / 3.7 m up.
Modular, digital CAN-based PLC

Husqvarna Demolition Robots.

High performance for safe demolition.

Our remote-controlled demolition robots are the very latest in demolition machines, featuring high power, low weight and functional design. They are the obvious choice for users who want manoeuvrable yet highly powerful, stable machines with long reach. Our DXR machines have a modern and easy-to-use remote control, with unrivaled user-friendliness and well-considered design. All this, combined with our experience, know-how and global presence mean you are also assured of highly accessible and competent service and support.

Husqvarna Far East Co., Ltd

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Varley Group

Value-for-Money Specialised Vehicle Solutions

The Varley Group is Australia's largest specialised vehicle manufacturer, supplying appliances for many government organisations and private industries, both domestically and globally. Varley's manufacturing capabilities include fire and rescue appliances, trailers, industrial units, ambulances, prisoner transport vehicles, mobile health clinics, road side assistance vans and many more.

As a significant manufacturer and employer with sites in Newcastle, Brisbane, Sydney, Melbourne and Ballarat, Varley is a proactive supporter of local communities and suppliers within each region. More than 500 employees are currently working across Varley Group's various facilities, and in the height of production a new appliance can be rolled off the production lines every two to three days at each site simultaneously.

Throughout the past eighteen months, Varley has developed the Next Generation Modular Fire Appliance; all designed and developed by the SEM Fire and Rescue branch in Ballarat, Victoria. The new concept was revealed as part of a national Australian tour, in which the appliance was demonstrated in various states.

▼ Pumper Tanker / ARFF.

Image courtesy of Stephen Schueler

There are numerous key advantages to this style of appliance, including:

- Integrated BA Seats
- Enhanced Crew Safety Systems
- Single Truck Operating System
- Any OEM Wheel Base
- Single or Dual Cab Options
- High Level of Customisation to suit your Application
- Compact Vehicle Size
- Multipurpose Appliance

In addition, Varley can offer lifetime after-purchase support that incorporates spare parts supply, servicing and customised training for all vehicles. As a result, Varley undoubtedly provide true value-for-money specialised vehicle solutions.

For more information, go to www.varleygroup.com

▶ Industrial Pumper Tanker.

Image courtesy of Blair Dellemijn

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"NEXT GENERATION TECHNOLOGY"

Cutters Edge®
An ISO-9001 Company
FIRE RESCUE SAWS

- *More Power... More Torque ... Better Fuel Efficiency*
- *75% Less Emissions*

The new Dual-Air intake engine technology significantly improves overall cutting performance and meets all Air Quality Control standards at the same time.

MULTI-CUT® Fire Rescue Saw

New 2100 Series includes two engine sizes: 70.7cc and 87.9cc. Each engine is designed for use with Cutters Edge Carbide Tipped BULLET Chain® to cut the widest range of materials found at fireground and rescue scenes.

MULTI-CUT® H Series Rotary Rescue Saw

New H Series Saws are engineered to work harder in the most extreme fire/rescue conditions. The new Dual-Air Intake engine is available in three sizes: 74cc, 94cc and 119cc. Equipped with the Cutters Edge ***Black Diamond Blade*** and now our new carbide-tipped ***BULLETBLADE®*** the Cutters Edge H Series Rotary Rescue Saws can cut virtually any material!

CE94 Concrete Cutting Rescue Chainsaw

A new technology 94cc engine and a new style Diamond chain cuts reinforced concrete up to 16-inches thick. Features a lighter weight power head and full-wrap handle for high performance concrete cutting in any position.

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Cutters Edge®
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FIRE RESCUE SAWS
Division of Edge Industries

FIREMIKS

An Example of the New Coming Industry Standard

A water motor-driven pump system is a mechanical way of dosing firefighting additives into the water, without the need of external power or pressure balance. The water motor-driven pump system is by many considered to be the new coming industry standard in fire-fighting installations.

Our FIREMIKS is such a system and it consists of two volumetric parts, one water motor and one concentrate pump, connected to each other through a direct drive coupling. With this solution the water motor acts like a combined flow meter/drive for the foam pump, so automatically achieving the correct ratio between water motor and foam pump, without any external flow meters, foam pumps or orifices.

The water motor may either a positive displacement type motor or a turbine. The difference between these two options is that, with a turbine as drive, the flow and pressure range will be limited as a turbine is only partly volumetric, (with a Pelton wheel drive a part of the water flow is wasted.)

FIREMIKS is a fully volumetric system with a positive displacement water motor instead of a turbine. This makes it possible to maintain the mathematical ratio between water motor and concentrate pump in a wider pressure and flow range, furthermore there is no waste of water.

▼ **Two FIREMIKS FM 8000-3-GP-F installed at two Pertamina Oil Fire trucks in Indonesia.**

Image courtesy of FIREMIKS

FIREMIKS can be used anywhere between a water source (hydrant or main water pump) and a nozzle (monitor, spray pipe, foam chamber, sprinkler head, low-ex, medium-ex or high- ex.) It does not need a pressure tank; only connect it to an atmospheric foam tank.

Operating Principle

FIREMIKS does not need any external energy. It is driven by the water flow which goes through the water motor. This generates a circular rotor motion, transferred to the concentrate pump over the direct-drive coupling. The concentrate is pumped into the water motor outlet, where dosing occurs.

Since the water motor and the pump are directly connected, the system is flow-proportional. The water motor rotor has 8 to 10 working wings, which gives an early and stable volumetric function of the water motor. The narrow interior design, along with low friction vanes, reduces noise level and creates long lasting durability.

With FIREMIKS a fire brigade can lay out a system consisting of one FIREMIKS and for ex. three, four or five nozzles working independently of each other, at different heights and lengths from main water pump.

FIREMIKS is offered in mainly two types; – GP is provided with a gear pump and is particularly suited for use in systems with higher flow rates, such as deluge systems, fire monitors and fire trucks. This type is also very suited for high viscosity extinguishing media concentrates.

– PP is provided with a piston pump and is particularly suited for use in systems with low start flows, for example, sprinkler systems, as well as for concentrates with low viscosity such as wetting agents. Both types can be supplied in Mobile versions.

FIREMIKS is available in different flow sizes, from max capacity 400 lpm to 12,000 lpm, and with dosing alternatives 1%, 2%, 3% as standard. Other options are available on request, including units with selectable dosing rates.

Due to its comparable low weight, compact design and no need of external energy, installation of a FIREMIKS is relatively easy. It can, if requested, be supplied with a dosing return valve enabling regular tests without consuming any concentrate, an economical and environmental-friendly option. FIREMIKS meets applicable parts of NFPA 11 and NFPA 1901 and production is made according to European directive 2006/42/EC. Third-party inspection reports from DNV-GL, Bureau Veritas are available.

Some reference examples are Pertamina – Indonesia, Oliver Tham Airport – South Africa, Jotun A/S – Norway, British Petroleum – Mozambique, Wärtsilä/Singapore Marin – Singapore, Rolls Royce Nuclear – UK, Thysssen-Krupp – Malaysia.

For more information, go to www.firemiks.com

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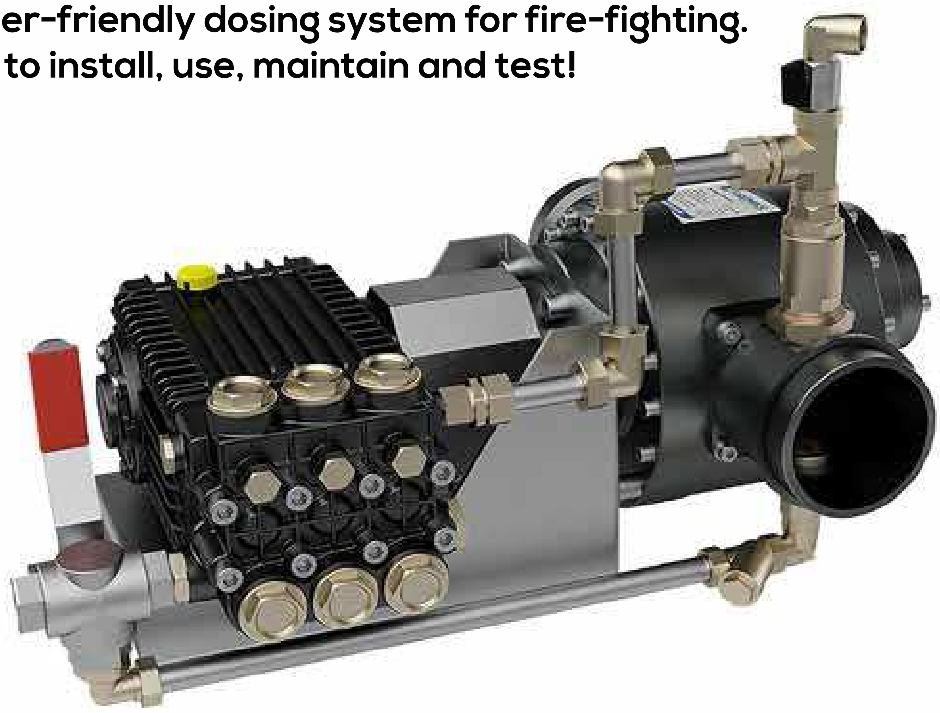
THE SWEDISH ORIGINAL

SIMPLICITY

The user-friendly dosing system for fire-fighting.
- Easy to install, use, maintain and test!



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LION International
Our Task – Your Protection

LION can look back on more than one hundred years of history in the development of new products and services – always at the center of attention: Ensuring the health, safety and performance of our heroes in their everyday life, with the highest possible quality.

Moving forward, Lion's innovative developments continue to set new standards in quality and function. With the development of innovations and the continuous improvement of our well-proven products and service, our objective remains the same: The safety of our customers! With innovative design features and new materials, we offer them the best possible freedom of movement with maximum protection.

Kinetic, the new protective suit from Lion, represents the idea that, by means of weight-saving design, functional tailoring and state-of-the-art materials, a new stage of protection and ergonomics can be achieved in the area of fire-fighting protective clothing.

Kinetic combines innovative outer fabrics, such as PBI® Max or NOMEX® Kinetic, with ParallonTM, the latest membrane from the house of GORE®. As well as very good insulation characteristics and extremely low weight, Kinetic convinces with excellent values of Ret, HTI and RHTI.

Design and functionality of the suit have been re-worked and optimized in accordance with knowledge gained from the latest ergonomic studies.

Features of the jacket include: a saddle-raglan cut, a special construction in the shoulder area, as well as a sleeve implemented in multiple-parts, guaranteeing excellent wear comfort. Well-proven details of the V-Force™ model, such as the hand-back protection through an extended outer sleeve hem or the reinforced thumb loop, have been retained in Kinetic.

In spite of diverse fixations and pockets, superfluous material has been avoided so that no additional layers block water-vapor transport. For example, the jacket is provided with external pockets with bellows on both sides, a radio-equipment pocket with adjustable elevation, as well as a lamp support for a lamp in the left-hand area. If necessary, further radio equipment can also be fixed here. In the shoulder area loops were incorporated for hand-held microphones, so that in case of hand-held microphones with digital radio, the antenna can protrude out over the shoulder.

The width adjustment on the sleeve, as well as all close-offs, are provided with new, improved grip straps. The front close-off has been combined with a panic zip-fastener and thus guarantees rapid and easy opening of the jacket. Reinforcements were attached on the elbow and sleeve hems for longer durability, where a pre-formation of the elbow area also ensures a higher level of mobility. In addition to this, parts of the two color jacket were made dark for dirt protection.

As well as different possibilities of velcro application for the fixing of name strips and back signs, a back print can also be attached as an alternative. In the same way, a customized ID tab can be applied on the jacket extension in the back area.

Features of the trousers include: "rotating" seams (a feature taken from the sportswear segment) were incorporated for the first time. An intelligent placement of the side pockets along these seams also guarantees optimal access with bent posture, while a three-dimensional pre-formation of the knee area with integrated padding enables an improved level of mobility. Pockets for additional padding at the legs are also provided.

The replaceable, breathable suspenders are provided with an adjustable and soft connecting piece in the neck area. The front close-off of the suspenders has been equipped with a safety lock in order to prevent any unintentional opening. The length of the suspenders can be adapted.

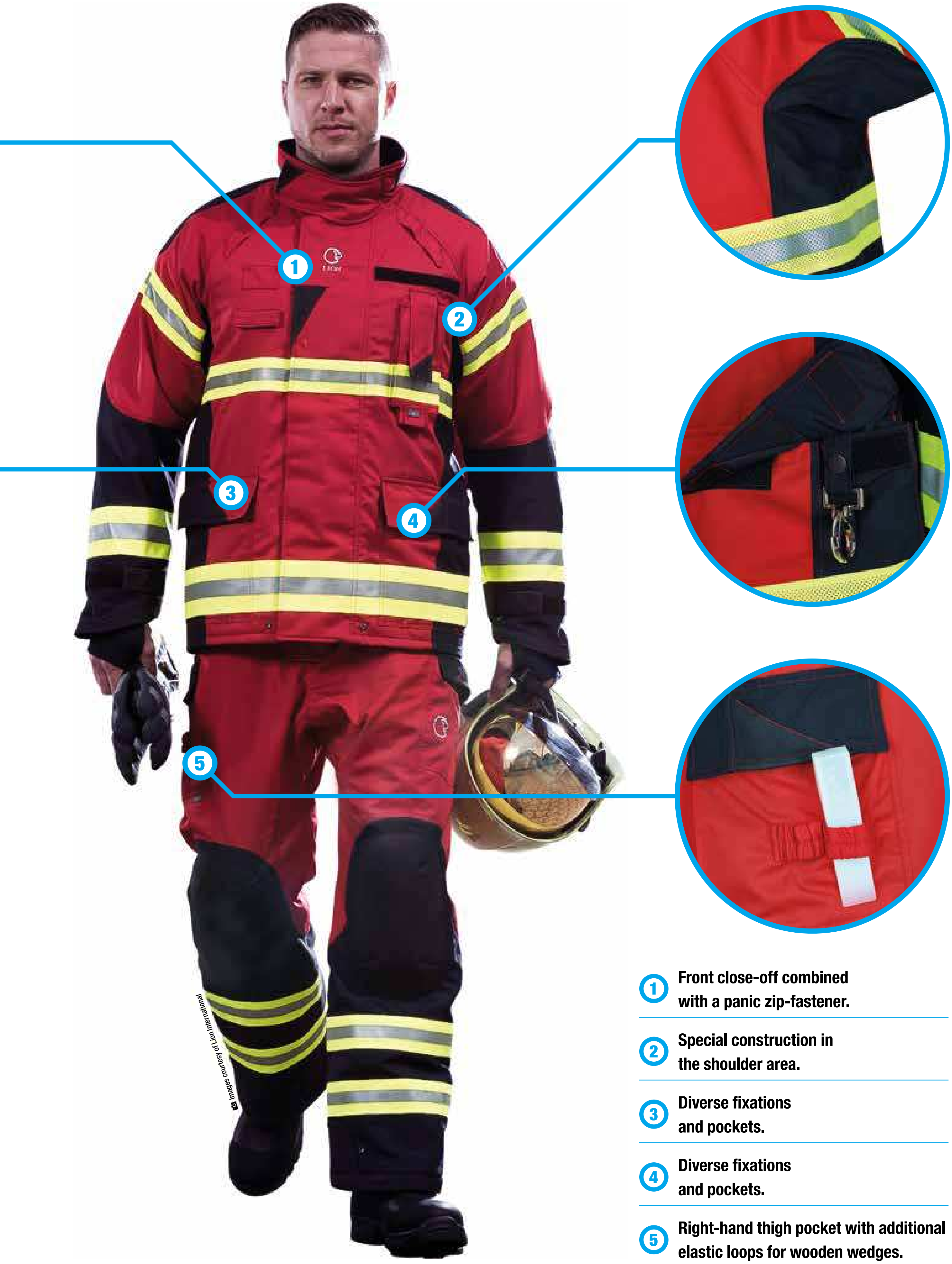
The waistband is provided with an improved width adjustment, grip straps and elastic, and, on the trouser fly, a new grip strap has been likewise incorporated for simpler opening and closing. The right-hand thigh pocket has been fitted with additional elastic loops for wooden wedges.

The well-proven, reinforced, trouser-hem cut-out, as well as new design of the crotch area has been adapted. As in the case of the jacket, dirt-sensitive locations have been darkened here.

Kinetic is available in different layer constructions and color combinations. Furthermore, additional outfitting with comfort suspenders or rescue loops can be implemented on request.

Experience the latest technologies close to the skin with regard to breathability, freedom of movement and lightness – discover Kinetic!

For more information, go to www.lioninternational.com/kinetic/



© Images courtesy of Lion International

① Front close-off combined with a panic zip-fastener.

② Special construction in the shoulder area.

③ Diverse fixations and pockets.

④ Diverse fixations and pockets.

⑤ Right-hand thigh pocket with additional elastic loops for wooden wedges.

Pac Fire Australia goes forward (but back) to early ownership beginnings

It is just more than 18 months since the ownership of Pac Fire Australia was reunited with the owners of Pacific Helmets New Zealand, and there has been a lot going on.

But going back to the early beginnings, in the late 1990's the Pacific helmet range was distributed in Australia by the then Protector Safety company. The helmets began to make major inroads into the purchasing plans of both structural and bushfire agency operations as they were not only unique in their construction, but unlike many other helmets they were all certified to AS/NZS Standards. The Kevlar reinforced helmets were proving (and have proved) to provide both extremely high levels of personal safety and protection, but they are also lightweight and very durable. Helmets that are 15+ years old with considerable levels of use and abuse, are regularly tested to the original laboratory test procedures and they still pass as if they are new helmets. That is a claim not made by any other helmet manufacturer in the world.

So with helmet sales in Australia taking off, Pacific Helmets New Zealand owners Marion and David Bennett set up Pacific Helmets Australia in conjunction with Keith and Kerrie Ward. This proved to be a very agreeable partnership for some 15 years until Keith decided that it was time that he retired. During these 15 years, Keith expanded the range of products sold to include a full range of PPE for emergency services, with some outstanding distribution rights for recognised branded products like Bristol Uniforms, ESKA fire gloves and YDS boots. As opportunities were identified, there came a whole range of other products required by emergency services – rescue tools, evacuation fans, fire hose to name just a few.

As these products came on-stream from 2005, the name of the company was changed to Pac Fire Australia, reflecting that fact that not only safety helmets were sold. Gradually representation was established in all major Australian states, and in the last 6 months a large new distribution centre was opened in Yatala, Southern Queensland in order to cope with the increasing volume of products. Of course, all this development also brings requirements for upgraded computer software, improved HR processes and the infrastructure to support the larger business.

To ensure coverage of all of Australia and to have both warehousing and support for the sales team, a branch warehouse in Adelaide exists to support both South and Western Australia customers and to provide a base for sales staff. Recently George Stojcevski was promoted to S.E Australian Sales Manager and he along with support from Head Office travel widely and regularly to all SE states and major

▼ **New PAC Fire distribution centre in Yatala, Queensland, Australia.**

Image courtesy of Pacific Helmets

customers. Kerry Lovett has responsibility for all sales in WA, Keith Ross travels throughout Queensland and NT, and the HQ sales team based in Yatala supports all sales operations.

While all this has been proceeding in Australia, Pacific Helmets in New Zealand also continues to expand. From the first Pacific F2 structural fire helmet sold to the New Zealand Fire Service in 1984, subsequently modified slightly for the London Fire Brigade in 1990, the range of helmet designs now exceeds 100 models and shape variations. Without exception, all helmets are certified to the appropriate international Standard (there are some 20 primary helmet Standards and many supporting Standards to be complied with), and along with ISO 9001 certification now held for over 20 years, the company is unique in the Southern Hemisphere.

Each year Pacific Helmets sells helmets to around 50 countries and has sold products in around 90 counties world-wide. Some of these countries have comparatively small annual requirements, but it is important to have contacts in as many countries as possible. There are also opportunities in oil and gas plants, mining, military, shipping and construction industries where head protection of the highest calibre is essential.

Perhaps the biggest change of all with the acquisition of Pac Fire is the decision by two more of the Bennett family to join the company and take over management of Pac Fire Australia. Effectively this means that on both sides of the Tasman, there is now the next generation of the family taking responsibility for day-to-day operations, even if David Bennett is not entirely letting go of the purse strings yet!

Grant Bennett has been back with the New Zealand company now for over eight years and is now General Manager. Sarah Bennett and her husband Paul Clark have now taken up their roles as General Manager and Business Development Manager (respectively), and have recently relocated from Melbourne to South Queensland. Sarah has had 15 years in the optical supply industry and holds a Business Masters degree from Otago Uni. For Paul it's a complete change of life having worked previously as an educational consultant providing guidance to schools regarding challenging behaviour. They have two young boys Leo and Lenny who keep them and the grandparents busy!

Images courtesy of Pacific Helmets

▲ Sarah Bennett, General Manager and Paul Clark, Business Development Manager for PAC Fire Australia.

▶ Grant Bennett, General Manager of Pacific Helmets (NZ) Ltd.

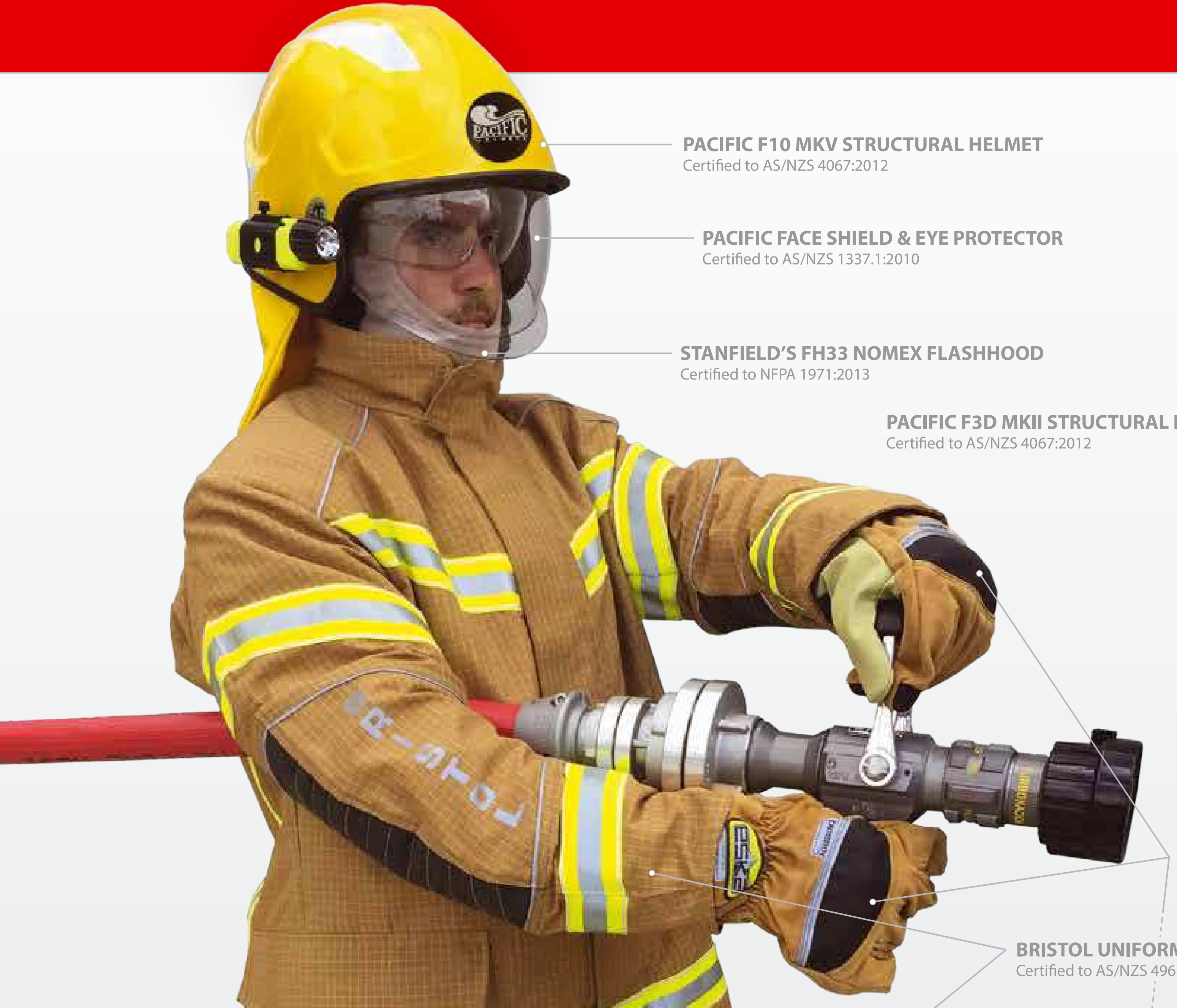
The "old master" David, reminds them that they are almost exactly at the age when he and Marion set Pacific Helmets up 32 years ago. He is hoping for a bit more time for a weekly golf day, and maybe a caravan drive around Australia in the near future. But if the current financial year is anything to go on with record sales of helmets both internationally and in Australia. He still fields technical questions and is starting to wonder when he will actually be sent off to pasture! He muses over the fact that as a young man he studied to become a Chartered Accountant, but actually ended up becoming one of the world's experts on the design of Standards certified safety helmets for emergency services.

It's been the very close working relationship of Pacific in New Zealand with Pac Fire in Australia that has driven this re-unification of the two companies. Also the Bennett family has had concerns for the continuity of the helmet business were the ownership to transfer to any investor or international safety products company. The helmet manufacturing plant in Wanganui New Zealand is a highly recognised and valued employer in their home city, where some of the staff have worked for the company almost as long as had David. Moreover, the company values its long-term relationships with customers and users of the helmet products.

The fact that the helmets have such a high level of safety performance saving lives and reducing the likelihood of serious injury to emergency crews remains extremely important to the family.

For more information, go to www.pacifichelmets.com

FOR YOUR PROTECTION



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STANFIELD'S FH33 NOMEX FLASHHOOD
Certified to NFPA 1971:2013

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TEISEN'S
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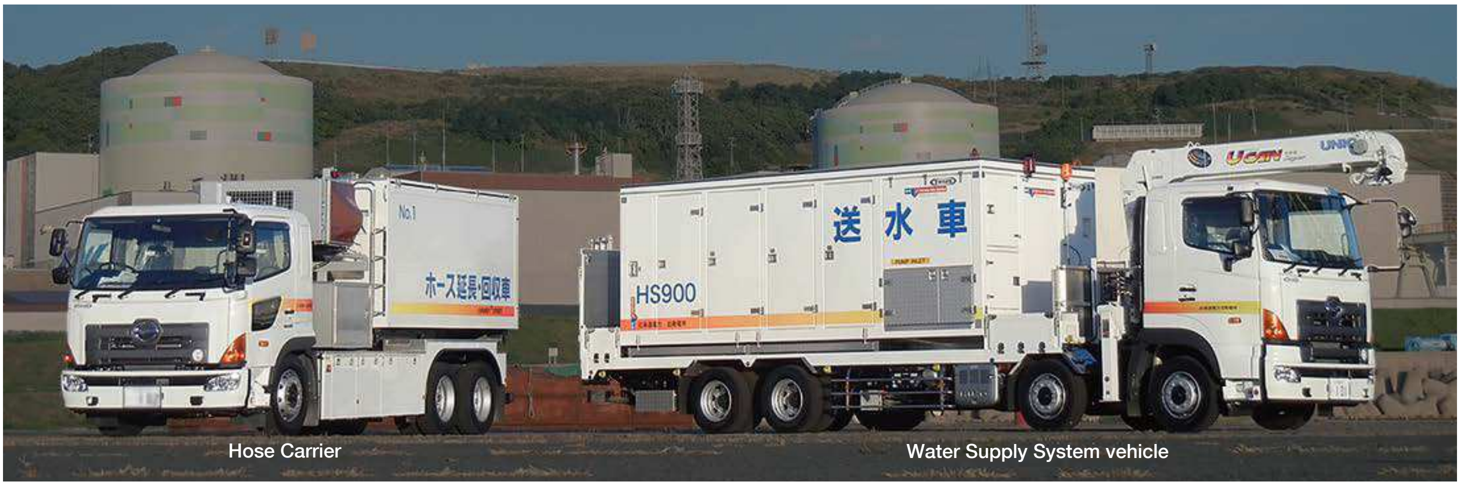

Hose Carrier

Water Supply System vehicle

The Long Distance Large Volume Water Supply System vehicles (Hydrosub System vehicles) can supply water at up to 30,000L/ min. over long distances for fire extinguishing in the event of disasters, oil tank fires or forest fires and can also be used for emergency cooling of nuclear power plants.

The Long Distance Large Volume Water Supply System vehicle and Hose Carrier further meet the following terrorism and severe accident measures in the current nuclear regulations set by Japan's Nuclear Regulation Authority (NRA)

■Cases corresponding to prevention of nuclear disasters:

- ●Response to intentional aircraft crashes
- ●Suppression of radioactive material dispersal
- ●Prevention of Containment Vessel failure & large release
- ●Prevention of core damage (Postulate multiple failures)

Over 80 sets of these products have been supplied to nuclear power plants.

■Water Supply System vehicle

Hydrosub Model		＊HS150	HS550(F)	HS900(F)	HS1200(F)
Water volume	L/min.	3,000	14,000	20,000	30,000
Water release pressure	MPa	1.2	1.2	1.2	1.2
Water intake depth	M	60	15	15	15
Vehicle dimensions	M(L×W×H)	8.0×2.5×3.5	12.0×2.5×3.5	12.0×2.5×3.5	12.0×2.5×3.5
Vehicle weight	Kg	15,000	22,000	24,000	25,000

● (F) includes foam mixer (option)　＊HS150 is a container model.

■Hose Carrier (with detachable hose container)

Hose Recovery Unit Model		HRU200 (for 150 ～ 200MM hose diameters)	HRU300 (for 250 ～ 300MM hose diameters)
Hose load	M	1,000 ～ 1,800M	400 ～ 600M
Vehicle dimensions	M(L×W×H)	7.8×2.5×3.8	8.4×2.5×3.3
Vehicle weight (hose not included)	Kg	12,100	14,300

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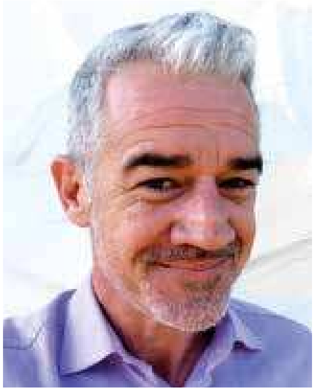
Finding Situation Awareness

“The perception of elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future.” So runs an academic definition on Situation Awareness (SA). For time poor incident management teams another definition is knowing what the hell is going on, anticipating what’s going to happen next and so enabling, at the next moment, a commander to make correct decisions– no pressure!



Matt Timson

In the context of planning, preparation and suppression of wildfires, SA is the cornerstone of good command – as it is in any uniformed government agency. This is crucial at the strategic level: the incident controller despatching units right up to state level controller, who has responsibility for multiple fires and guiding other agencies in achieving critical obligations. APF magazine readers are aware of this; and in high fire season, probably lose sleep over it.

The most junior in the chain of command, who actually sees the incident developing, probably feels the best informed. After all, he / she can see the fire, is aware of the current situation, and knows from good training and experience what to do. What about decision making at the strategic level? Here commanders labour in a far more complex environment with a cascading, and ever changing, list of priorities –and stands in isolation, that is not actually viewing the incident(s).

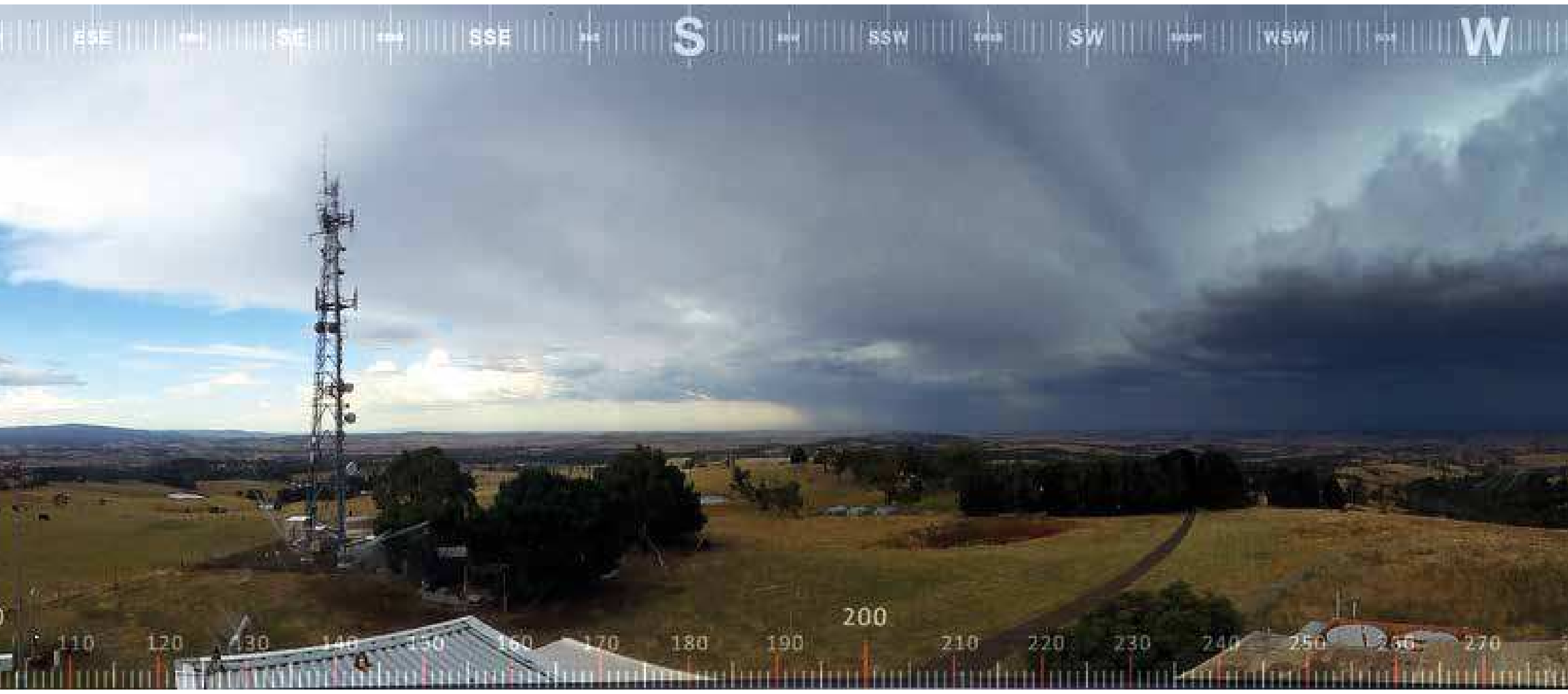
Visual perception is our dominant sense; it leads to better cognitive understanding and SA. But commanders and incident management teams make decisions without viewing the incident(s). Of course maps, site descriptions, satellite imagery and even memory and experience help fill the picture. But overall humans rely on their sight to understand a complex situation.

New technologies are being quickly introduced. Unmanned Aerial Vehicles (UAVs) or drones are being added to the range of technologies available to commanders. They provide a method

▼ The ODIS EYE360, St Kilda, Melbourne Australia. The fully integrated solid-state unit can be solar powered and utilises existing wireless communications.

Image courtesy of ODIS Technologies

Matt Timson is the founder and CEO of ODIS Technologies Pty Ltd.



▲ 360 degree image of an approaching storm captured from Pretty Sally fire tower, Kilmore Gap, Victoria Australia.

of capturing imagery. With miniaturization this option is becoming more attractive. But Is this enough? And is it the right solution in known wildfire prone rural areas?

Matt Timson has never fought a bush fire in his life. But he knows how to create compelling images. Matt worked in the broadcast television and advertising industries for years, and in the course of looking for a solution to a problem, developed a remote 360 degree camera system that I believe will offer an eyes-on-the-ground solution for fire fighters.

"The idea for the first camera system was a solution to a problem." Matt explains "I was looking for a robust remote camera system that could deliver time-lapse weather clips for broadcast news each night. But I wanted the freedom to move the camera while shooting in time-lapse." This would normally require expensive motion-controlled cameras that calls for the camera movement to be pre-programmed. "I wanted to show the audience an approaching storm front and follow it as it sweeps over the city. But you can't pre-program the weather, and moving parts means high maintenance."

After an exhaustive search turned up nothing suitable, Matt went to work on creating his own solution. He realised that by shooting everything he could choose what to show the audience and when. The genesis of the 360 deg ODIS system first went to air in Sydney without a hitch and was a hit with news chiefs. After further improvements two more cameras were installed in Brisbane and Melbourne and the system has been in continuous operation for over 5 years.

I spoke to Matt about the inspiration for the EYE360, a tough new breed of camera the team have developed. "My parents live in central Victoria, so every fire season I'm on high alert. I thought if we had access to a network of these cameras around the state, they could assist in early detection and may even help save lives."

This new breed technology has special appeal to Fire-Fighters. The EYE360 camera units don't require mains power or wired communications so can be installed almost anywhere. The compact IP67 units are totally solid-state and virtually maintenance free, capturing ultra-high resolution 360° x 120° images at regular pre-set intervals. The images are acquired instantly, seamlessly and at high frequency, allowing headquarters staff to accurately review the entire remote location in very high quality 360° time-lapse. The data is transmitted to the Cloud as well as stored locally as a back-up. The system can also integrate an array of local and third-part data directly into the vision to provide enhanced environmental intelligence.

The ability to see all of the elements in a remote situation, and how they got there is at the heart of SA. Matt described how Fire headquarters could use the technology. "Our research told us that gathering data is only half the task. Providing it in a form that's useable and minimises data overload while maximising decision-making potential is also essential. High quality 360 degree time-lapse provides that perfectly. The data can be delivered as open standard API for easy integration into command's ICT system and disseminated with other information coming in from the field." I agree, and in fact see a military application as well.

Matt explained that a network of cameras would allow incident controllers to view a single fire from multiple angles, and at the same time the state-level controller could see everything including multiple incidents from just one camera. Matt expanded this point, "This offers the ability to remotely triangulate and locate fires, as well as rewind the entire 360 degree scene to the point of ignition and very quickly and concisely review the situation right up to the present time." I can see this as a useful briefing tool and at shift changes. This can also prove useful in post-event performance and forensic analysis as well as dispute resolution in costly legal proceedings and inquiries.

Matt has a public information function in mind. "Public access to the same vision during high fire periods has the potential to further increase early warnings. Over 90% of all fires reported to agencies are

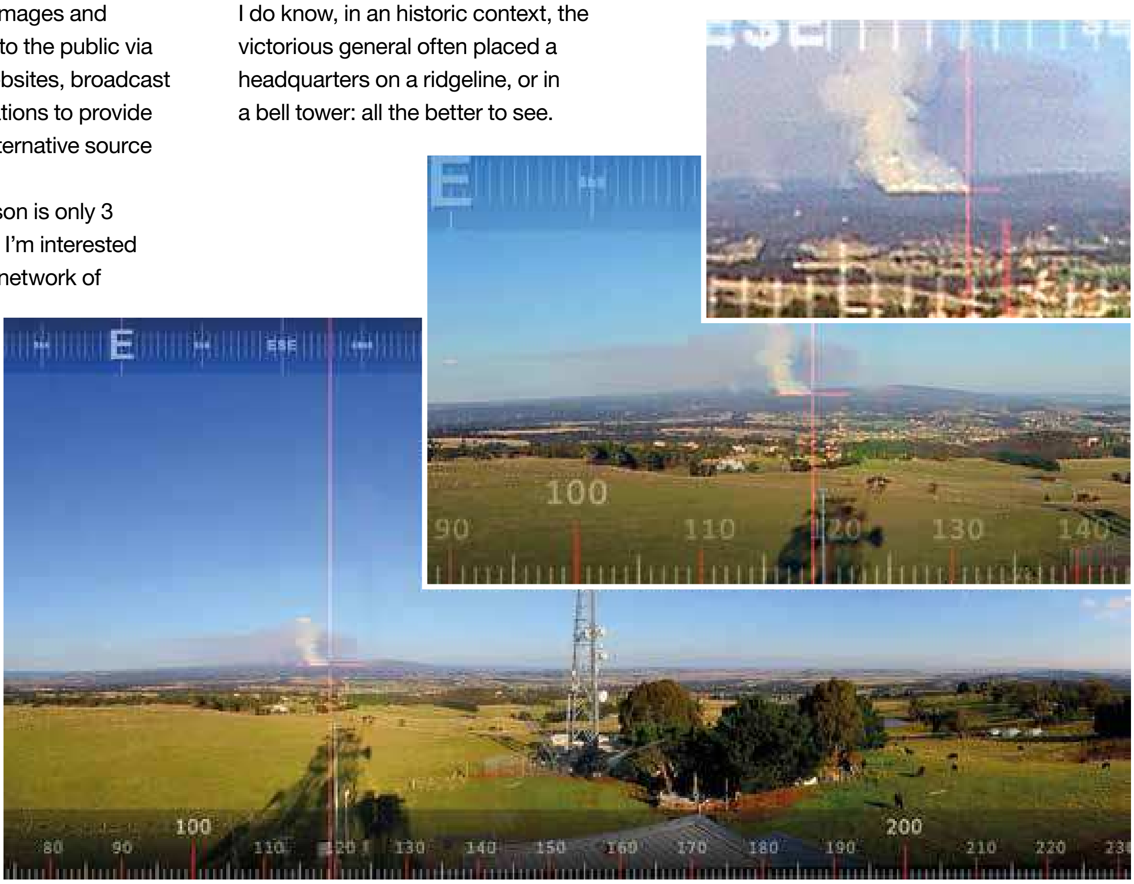
by the public so empowering communities to self-monitor would put more eyes on the ground at critical times". Matt referred to the Victorian Bushfire Royal Commission, "one of the conclusions in the Royal Commission Report was that the public needs an alternative source of information. The "OOO" help line was overwhelmed by non-critical calls, while more urgent calls couldn't get through. The 360 degree ODIS images and data could be supplied to the public via emergency services websites, broadcast TV and network applications to provide an easily understood alternative source of information."

As the peak fire season is only 3 or 4 months of the year, I'm interested to know the costs for a network of high-end cameras. "We see a number of options including a flexible online service model as an effective way to provide cost sharing and seasonal offsets with complimentary industry partners."

I reflect back on my own experience within a military headquarters. Knowing how and why incidents arise is not just important but crucial. And I know how thirsty commanders are for information. I do know, in an historic context, the victorious general often placed a headquarters on a ridgeline, or in a bell tower: all the better to see.

Squadron Leader Hugh Dolan Ret'd was a military intelligence operator for 17 years, serving in various headquarters roles in Australia and overseas. He has written two books on decision superiority, especially the role of aerial intelligence in ANZAC Headquarters during the Gallipoli campaign.

For more information, email info@odistech.com.au



▶ The high resolution 360 degree time-lapse sequences enables an unlimited number of users the ability to observe the entire location at once or independently zoom into any area of interest. The time-stamped sequences can be rewound to the point of ignition of multiple simultaneous fires.

Images courtesy of ODIS Technologies

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TouchControl is Advanced's new touchscreen remote control terminal & repeater. It delivers network monitoring and control as well as active maps and zone plans, all in a package that enhances any architectural environment and is easy to install and configure.

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Should the Fire Industry Compromise on Touchscreen Technology?

The fire industry has experimented with touchscreens for a number of years, mainly adding small, less effective technology into fire panels. The result is increased panel costs, and compromised panel and network control because the screens are too small to be really useful and many have not taken advantage of the real benefits a touchscreen can deliver.

John Newton

John Newton is products manager at global fire systems business Advanced. Responsible for all of Advanced's new innovations and multiple product lines, he started his life in the fire industry as an installation, servicing and commissioning engineer and has worked in sales, technical and now products. During his 30 year career he has worked for some of the world's biggest fire detection and alarm businesses.

Advanced has recently completed a three year development project to deliver a 'no compromise' touchscreen solution to the fire industry in the shape of its TouchControl repeater and remote control terminal. John Newton is the product manager behind the project:

"We are certainly not the first to deliver a fire touchscreen," he said. "Many manufacturers have launched them before us and some have advantages. As a business though, we were never convinced that what was being delivered really fulfilled the brief. We made the decision to take our time and get the spec right.

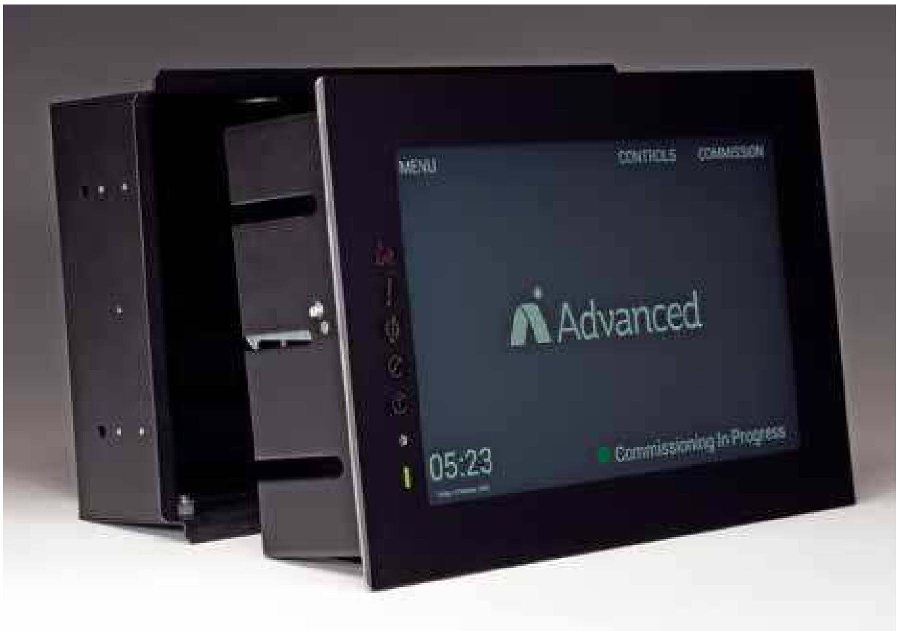
Why a Touchscreen?

"The first question was why would you want a touchscreen in a fire panel? 'To touch' is the obvious answer, and that really means control and reporting. To have a large enough screen area to do real monitoring and control meant the screen needed to grow considerably, and TouchControl has a 10" HD screen, one of the largest available.

"This screen size then gives you the opportunity to design a really effective user interface. Our first designs didn't work well in initial customer testing, so we started again from scratch and delivered the new navigation system which really does deliver.

It uses a series of 'buttons' that include colour coded status indication and all available device and zone info. One of the key benefits of the touchscreen is the amount of info you can display in one screen, way more than a traditional panel or repeater display. Of course doing this in a useable interface is the real trick.

TouchControl delivers 'at a glance' oversight and easy control of the panel or network right down to zone and device level. Users can immediately identify areas in fire, fault and disablement, test etc.



▼ **Making the touchscreen a panel in its own right makes ease of installation a critical issue.**

Image courtesy of Advanced

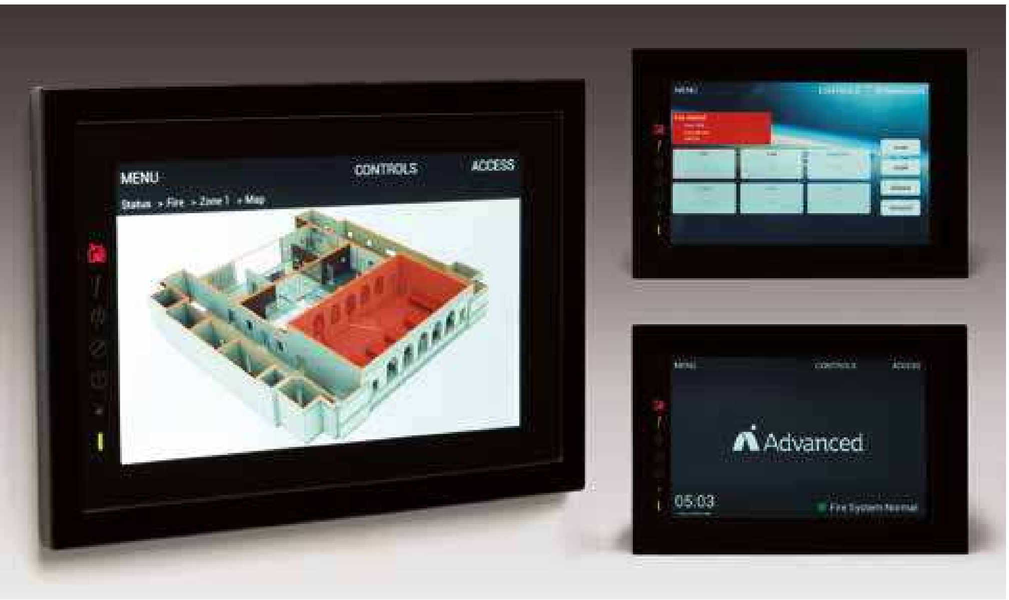


Image courtesy of Advanced

▲ To take advantage of the unique features a touchscreen delivers a unique interface with Active maps was developed.

Active Maps and Zone Plans

“A unique feature and a market first is Active Maps and Zone plans, a new way to monitor fire systems using dynamic graphics, that can be made up of anything from CAD drawings to photographs. Some fire alarm graphics systems can be time consuming and complicated, but we have made it very easy to add them to the device using our new Map App software.

“A larger screen means that it definitely couldn’t sensibly become part of the fire panel, and we were adamant we did not want add cost to our panels. So early in the specification stage TouchControl became a repeater and remote control terminal.

“We were then adamant that it must deliver new features and services specifically suited to touchscreens, and perform all the functions an Advanced repeater/remote control terminal does currently.

“Then when we looked at where customers would install the product, which is receptions, lobbies and public areas, and it became very obvious TouchControl needed to look aesthetically very high quality, and to enhance these often expensively designed areas.

Low Profile

“TouchControl is designed to be recessed (though you can surface mount it) and has a low profile bezel to both secure it (a standards requirement), and finish off the looks. We designed it to EN54-2&4 this meant adding in LED indicators for fire, fault etc, not just with standard LEDs but in keeping with the concept.

“The choice of screen technology was also a large area of debate. Capacitive screens – as used on most phones and tablets – are ubiquitous but the underlying technology changes often. The other technology, resistive screens are more common in industrial settings, importantly they respond, even to gloved hands, (thinking of the fire and rescue services or nurse stations), and are more robust with a technology that has the same long product lifetime as an Advanced panel.

Easy Install and Config

“We also spent time looking at how TouchControl would be installed, in both first and second fix, right through to config and maintenance, ensuring it was easy at every stage. We developed a new install system, the backbox goes in and wiring terminations are made off. Then the screen is cable clipped in and slides into the housing. All Active Maps and zone plans are added via a microSD card that slots into the PCB.

“Configuration is fast and simple via our config tool and all device, zone text etc is imported from the fire system. It’s up and running very quickly. Users can use a number of on board screen backgrounds or can import their own, which could be a logo, picture, instructions you name it.

“The device can also run in Presentation Mode. This means it will show a timed series of slides that could be site marketing material or health and safety info, on a loop. However when the screen is touched or when a fire signal or any other signal from the fire system is received, it instantly returns to core fire operations.

Control Options

“To ensure system security, TouchControl works via Advanced’s three-level passcode system. At level one users can view information only and can evacuate, reset, resound, mute, silence and reset using a passcode. At level two they can control the network and in level three change configuration settings. A passcode is required to move between each level.”

“On receiving a Fire signal the interface immediate defaults to a screen showing the latest fires. Users can then proceed using the status buttons or use Active Maps to show the position of the fire (and zones in other status types such as fault, test and disablement) using graphics. By using different building views at each level the user can zoom in an out of the zone in question from a site wide view to a detailed plan.”

Depending on the access level, user can: Evacuate/Mute/Silence/Resound and Reset; view fires/faults/disablements/alarms/inputs/outputs/supervisory and network via ‘instant filters’; view/enable/disable zones; view/enable/disable devices; enable/disable outputs by type; enable Walk Test mode; test display/zones/outputs/buzzer and LEDs; quickly access all zones in fire/fault/disablement/test via ‘instant filters’ and where allowed change status; view 1,000 general and 500 Fire event log; and set network time and date.

The Future

John summarised: “TouchControl is an exceptional product and the feedback from our customers has been overwhelming and positive.

“It has been an exciting product to bring to market. The fire industry is quite right to look at consumer technology and see what part it can play in enhanced fire alarm and detection systems. The real issue is that in our, long lifecycle, standards-led market that’s focused on life safety, we are more limited. However, TouchControl has also proved that we should not compromise. If we can do something better, we should try because our journey, which started with ‘why?’ has delivered something with numerous unique new benefits.”

For more information, go to touchcontrol.advancedco.com

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Developing standards in the Asia-Pacific region

Standards Australia is the independent and not-for-profit developer of internationally-aligned Australian Standards. In this column, Tim Wheeler, National Sector Manager of Standards Australia, talks about the organisation's role in developing standards in the Asia-Pacific region.

Tim Wheeler

Tim Wheeler, National Sector Manager for Building and Construction, Standards Australia.

Fire safety has been in the news a lot lately. The high-rise apartment fire in Melbourne's Docklands, which has been blamed on external cladding that did not conform to combustibility standards, prompted an inquiry by the Senate on building products imported into Australia.

While Australia reviews its standards and conformance system, we should also take the opportunity to introduce a measure of healthy introspection. How do Australia's standards compare with the rest of the region, and indeed the rest of the world? What can we learn from and do better?

In today's interconnected world, where globalised product supply chains stretch across different countries, most houses in Australia will have building materials that are imported from different parts of the world. This is happening not just because businesses want to reduce costs. They do this in response to increasing customer demand for lower prices, greater product options and better value for money.

This is why harmonised, mutually recognised and internationally-aligned standards are so important. All around the world, standards open up market access for businesses, and boost trade and investment by reducing barriers to trade. Standards that provide a baseline level of safety requirements allow markets and consumers to have confidence in the quality of products and services.

It all starts from countries working together to share best practices. Standards Australia has been very active in strengthening our partnerships with other countries in the region.

Singapore

In June 2015, Australia and Singapore deepened bilateral cooperation with a strong focus on facilitating bilateral trade and investment under a Comprehensive Strategic Partnership.

A key component of this cooperation is the harmonisation and alignment of technical standards across both economies. SPRING Singapore and Standards Australia are intensifying collaboration with a view to aligning standards where possible.

As two of the leading national standards bodies in the Asia-Pacific region, it makes sense for us to pool our resources where there is mutual benefit; and to align our standards development programs to foster innovation, productivity, industry competitiveness and market access in the region.

We have identified a number of areas in early discussions, such as the built environment, including heating, ventilation, and air conditioning (HVAC) and fire services engineering; the silver economy (another name for the 'grey' economy); and intergenerational change.

We aim to start with international standards, identify what works for both economies and to map out a standards infrastructure that provides the greatest benefits with the best use of resources.

We also aim to actively explore areas where harmonised and aligned standards will fit our society in future. We have had great support from both governments for this process, all the way up to the Prime Ministers of both countries.

New Caledonia

At the invitation of the New Caledonian Government, Standards Australia is working on a project in New Caledonia in collaboration with AFNOR, the French national standards body. The project aims to build capacity in New Caledonia for standards development, through sharing best practices, experiences and information in the area of building and construction standards. The first phase of the project includes a mapping of both countries' standards, to identify similarities and explore potential areas for harmonisation. This project will be of mutual benefit and could potentially boost two-way trade and investment between Australia and New Caledonia.

Growing Australia's Influence Internationally

We have also been helping our neighbours in capacity-building projects. Recently, in association with SPRING Singapore and ISO's Regional Office in the Asia Pacific, Standards Australia conducted an Institutional Capacity Building Workshop with Myanmar's national standards body, the Myanmar Department of Research and Innovation (DRI). This workshop will assist DRI to develop further procedures that will strengthen the organisation's capacity and ability to participate in national and international standards development activities. The goal was to enhance trade and economic benefits for Myanmar and the region through setting up business-friendly standardisation infrastructure based on international systems and norms.

Standards Australia continues to be very active at the technical and governance levels in regional and international standards bodies, such as the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC), the Pacific Area Standards Congress (PASC), and the Asia-Pacific Economic Cooperation's Sub-Committee on Standards and Conformance (APEC SCSC). Mr Adrian O'Connell, our Deputy Chief Executive Officer, has been re-elected for another term on the ISO Technical Management Board. He also serves as the Executive Chair of PASC.

Australia is represented on all major IEC governance committees including the IEC Council Board, Strategic Management Board and the Conformity Assessment Board. This high level of engagement ensures that Australia is able to exercise leadership in areas of standards development that support Australia's national interests.

Our work would not have been possible without the experts that make up our technical committees.

Standards Australia's annual Standards Awards are presented to those who have made significant contributions to standardisation. This year, the inaugural WR Hebblewhite Medal for Outstanding Contribution or Distinguished Service in Standards Development, named after our first and longest-serving Chief Executive William Rayner Hebblewhite, was presented to a very deserving winner, Mr Russell Shephard, AFSM.

Image courtesy of Standards Australia

▲ Standards Australia with 2015 Standards Awards winners: Chairman Richard Brooks, Chief Executive Officer Dr Bronwyn Evans, Robyn Williams, Enzo Alfonsetti, Dr Anthony Kachenko, Petra Hansen and Russell Shephard.

Image courtesy of the Ministry of Communications and Information, Singapore

▶ Signing of Memorandum of Understanding between SPRING Singapore and Standards Australia, witnessed by the Prime Ministers of both countries.

Russell has been a champion of standards both in Australia and overseas. More than twenty years of his career were spent in standardisation work for Personal Protection Equipment (PPE) for firefighters, representing the Australasian Fire and Emergency Services Authority Council and serving as Chair of Technical Committee SF-049, Firefighters Personal Protective Equipment, and a number of other fire safety committees.

His extensive expertise is held in high regard by the international firefighting PPE community. In 2011, he worked tirelessly to achieve worldwide consensus on ISO 16073, Wildland firefighting personal protective equipment – Requirements and test methods, as a single Standard to cover minimum performance requirements and methods for all wildland personal protective equipment.

Recently in 2014, he became Chair of ISO TC 94/SC 14, Firefighters' Personal Protection. He was awarded the Australian Fire Service Medal in 2007 for his contribution to enhancing safety in the Australian Fire Industry.

Russell's work on the national and international levels has contributed to the health and safety of many of our finest and bravest, and has helped countries from all over the world to be on the same page when it comes to fire safety.

For more information, go to www.standards.org.au

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Investing In Your Protection and Protecting Your Investment

The importance of correct purchasing considerations and the associated dynamics for firefighters Personal Protective Equipment/Personal Protective Clothing (PPE/PPC). This article deals with the most important asset that a fire service has, its Firefighters. Agencies invest considerable amounts of money in training, resources, operational readiness and a range of issues, but often look for major cost savings in the last line of defence of firefighters, their PPE.

Mark L. Gribble

Mark L. Gibble is a member of the International Standards Organisation (ISO) and Standards Australia representative for firefighting PPE.

The critical importance on "focusing on the cost of the project, rather than the cost of the purchase", cannot be emphasized enough. The cost efficiencies that are achievable when buying smarter and less often, is often the difference between quality components and good manufacturing that lasts, and poor protection and frequent replacement.

A key feature is to have a lightweight durable system. This is easily determined when dry, but another important factor to consider is its weight when it is wet. Just how much water does your ensemble absorb? At a kilogram per litre, this becomes an important consideration. In an upcoming article I will expand on the critical importance of protecting the air layer in the thermal barrier from absorbing this water, especially given the fact that water transfers heat about 21 times faster than air. "Wet v Dry" TPP tests* on turnout gear indicate that your gear can lose about one third of its protective performance if the liner is wetted with only two grams of water while the shell is dry. * Biotherm Test # 113182,et al.

Therefore a vital component of a Structural Firefighting Ensemble is the moisture barrier. The subtle difference between a good quality and performing moisture barrier, and a poor one, can see the barrier disintegrate into a cracked or even powdered mess in the base of the jacket in less than half the life expectancy of the garment, leaving the firefighter venerable to injury or worse. Good moisture barriers on the other hand can assist in protecting the thermal barrier so it continues to protect against heat and flame. They can also protect against a base range of chemicals, water ingress and blood borne pathogens, and still be highly "breathable". While the term "breathable" suggests the passage of air, the science of good meta-bolic heat release in Structural Firefighting PPC is more about the

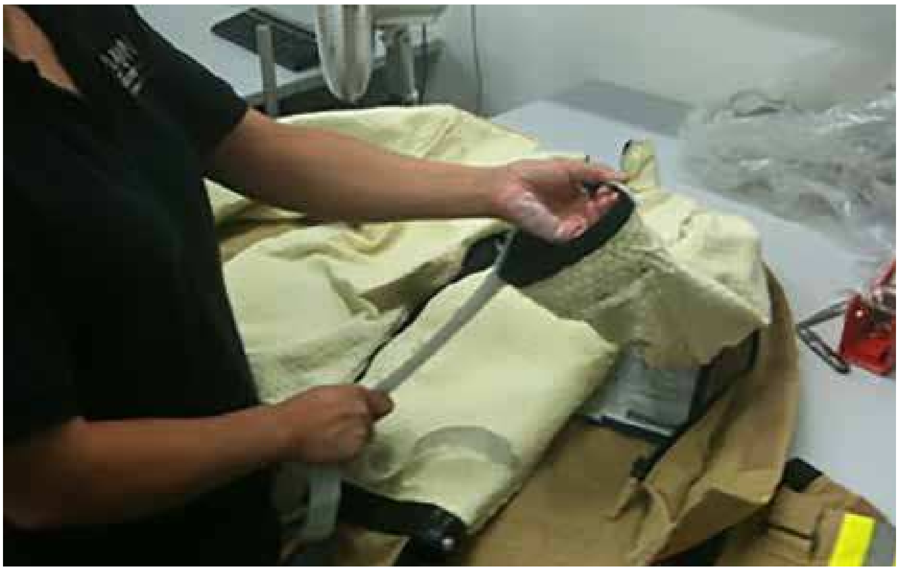

Image courtesy of Mark L. Gribble

Image courtesy of Mark L. Gribble

management of moisture and evaporative transfer. In my next article entitled “What Does Your PPC Protect You Against”, I will expand on this question further.

Outer shells which serve to protect the “engine room” of the ensemble need to be a quality component and pass the relevant tests within the Standard, and have good post burn strength and flexibility and compliment the other components which make up the science of protection of today’s firefighters.

Subtle things like the difference between single or double stitching and thread quality, can see the difference between high repair frequency and therefore down time of the garment or being in service and protecting the firefighter.

High lubricity inner linings which assist wicking water away and help in allowing the liner to not stick to the firefighter, play a role in the firefighter’s comfort factor. However one of the major factors in designing a stress free clothing system is the ergonomic features built into the ensemble.

While a set of garments may look desirable and made up of some good components, the ability of the clothing to allow the unrestricted movement of the firefighter, during the wide range of challenges of an emergency incident is very desirable. There are many innovative features built into the design to assist in the “Action” of the garments. “Action” in the back of the knees, different cuts and shapes, various sleave shapes and designs and a range of other features all contribute to the firefighter being able to maintain a less stressful and balanced physiology.

Braces or suspenders on the over pants or bunker pants need to have good elastic memory, so the trousers don’t sit too low and wear out on the bottom hem. They also need to be of a configuration and design that they don’t fall off your shoulders and are easily adjusted. Some are even including cooling mechanisms.

However like all things new and innovative, the vital balance of lightweight, functional and breathable needs to prevail. It becomes all too easy to think the inclusion of every piece of available technology should be included. More is not always better.

This is when a forensic analysis of an agreed risk assessment which has key end-user input, provides the balance required. It is very easy to start with good components, but buy adding too many features you may run the risk of “over engineering” the entire ensemble. Sometimes these features are added by the manufacturer in the interest of appearance, in the hope of providing a “market edge”, or even increased sales. The bottom line is, be discerning, and if a given feature adds value in functionality and performance, and maintains compliance with your objective, risk assessment and key criteria, then it may be a worthwhile inclusion.

Given the requirement for the ensemble to facilitate the metabolic heat release of the firefighter, sizing is a key requirement when purchasing. Those that choose a very snug fit, often negate some of the ergonomic features and breathability.

The anthropometrical needs of a given fire service can have a very broad range of sizing requirements. All of these need to be catered for from male to female, from tall to short, from stocky to thin, and still achieve the compatibility and functionality that is required by the ever increasing demands of tomorrows firefighter. Part of that compatibility consideration is how the Station Uniform compliments the performance of the Structural Firefighting Ensemble or any other PPC.

In addition to these standard features, technology and associated telemetry is helping to keep firefighters safe. Structural Firefighting PPC with built-in Thermal Sensor Technology (TST) delivers lightweight and flexible “intelligent” firefighter clothing that indicates when temperature increase, and provides flashing alerts.

In a previous article I spoke about the vital importance of compatibility. This is one of the most important considerations and relates to the compatibility of associated PPE and PPC, worn in conjunction with the Structural Firefighting clothing. It also relates to the interface areas on the body where items of PPC/PPE meet the clothing and are required to maintain that overlap or interface of protection. It also refers to having all firefighters who are required to work together in the “Hot” zone of structural firefighting incident, to have the same level of protection.

Therefore a comprehensive knowledge of the performance level of the current PPC is vital when purchasing the next generation of PPC. Some departments have used a “Transitional” approach of only replacing or upgrading to the new ensemble on an “as needs basis”, even when there are different performance levels in the components of the old and new PPC. This runs the risk of two firefighters working in the same hostile fire environment with different levels of performance in their PPC. Sometimes these different sets of PPC look the same from the outside.

This places an unfair burden not only on the firefighters, but the Incident Commander who is trying to deliver a consistent safe Dynamic Risk Assessment for all the Firefighting staff at the emergency incident.

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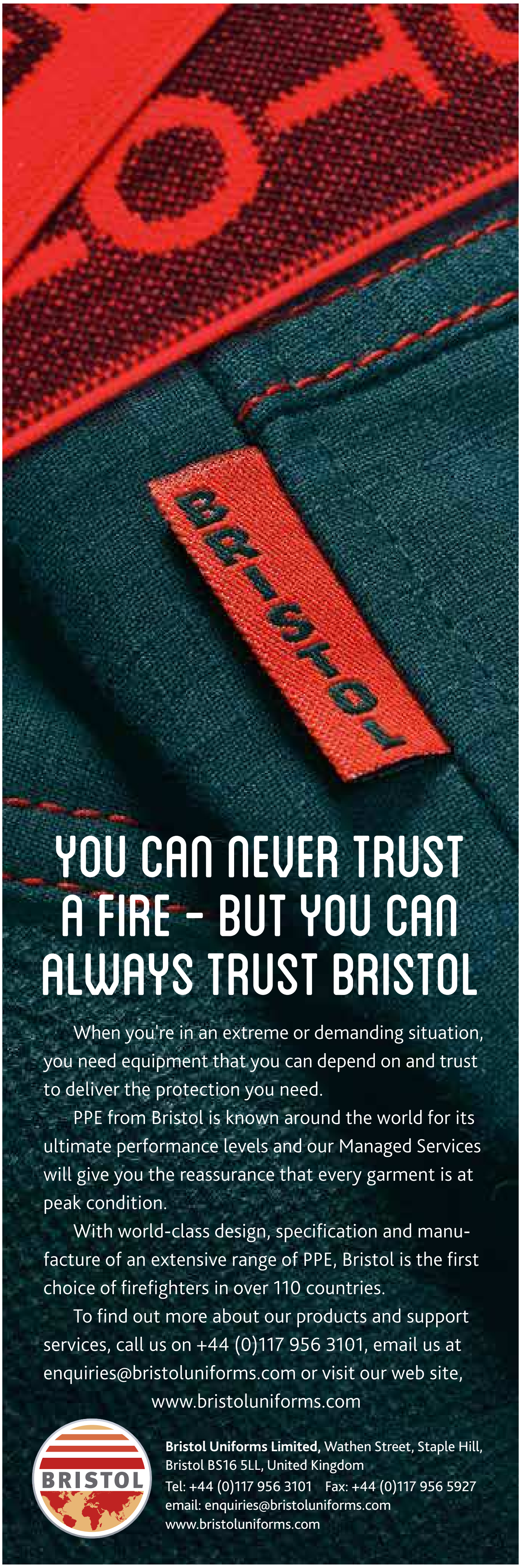

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Image courtesy of Mark L. Gribble

Due to the increasing financial pressures on fire services, and sometimes diverse numbers of fire services in a given area, there has been some attempts at the "Collaborative Purchasing" model, where a number of fire services combine to make a collective purchase. In theory this has the potential to save money on the purchase and the savings could be delivered back to the safety of front line operations. However it becomes more critical in getting the decision correct and sustainable for the future, only because getting it wrong will adversely affect more firefighters. Therefore the involvement of key stakeholders is vital, and should include a high percentage of well-informed "end-user" representation at the decision making table.

We have touched on just some of the considerations on selection of PPC and if you get that part right, then the next step is ensuring that you are "Protecting Your Investment".

Protecting Your Investment

During the life of your PPC, how do you know if it is still "Fit For Purpose"? In fact how do you even determine the life of garments that are worn in high use areas compared to lower use areas of your fire service?

Some time ago people would simply make an estimate based partly on previous history of the garment, and the time it lasted. A more refined approach is not based solely on time, but on "wash cycles". This is obviously dependent on having a good tracking system which records when the garment is washed and an assurance that the washing requirements stipulated by the manufacturer, is strictly followed. Correct laundering regimes, is one of the key criteria for protecting your investment and therefore continuing to provide the correct level of protection to the firefighter. As in all things there are god and bad practices. As I visit fire departments around the world I am occasionally surprised to find firefighters still taking their structural Firefighting PPC home and washing it in the home washing machine with the rest of their laundry. This out dated practice drastically increases the risk of the carcinogenic contaminates from the dirty PPC, infiltrating into the other clothing and undesirable particulate residues remaining in the washing machine for the next load. Some recent studies are also looking at the dermal and respiratory pathway of exposure to these toxic properties, not only on the fireground, but also by poor storage, transportation and laundering practices. Many advances have been made over the last 10 years in dedicated laundering facilities and in practices that focus on the correct temperature, washing speed, cycle and particularly cleaning agent used to better clean and protect the garments. While the correct drying regimes may take a little longer, it is just as important as the rest of the process.

Some ensembles are designed with a removable inner liner so they can wash the outer and inner components separately. This is done so as not to mix the contaminates usually found on the outer shell, in with the moisture barrier, thermal barrier and inner lining. It also provides the extra benefit of being able to better inspect the internal components of the ensemble. If this is your choice then the attachment mechanism needs to ensure that they line up exactly with no gaps and that the ID/Tracking Code is on each item of clothing and is such that it helps to ensure that the correct components are reassembled together. Additionally there needs to be good operational and procedural controls in place, to ensure that they are always worn together when engaging in Structural Firefighting. Some manufacturers have chosen a small indicator tab which is a contrasting colour and is easily visible on the fireground, which shows that both components are present.

Combine this with a regular and comprehensive inspection regime, it should deliver a garment that is fit for purpose. A valuable fit for purpose indicator during the inspection regime is a periodic test of the moisture barrier (if present) by a static water test. This can be done at station and the details are listed in the NFPA Standard 1851-2014 Edition, Chapter 12.2.

In fact Standards most often devote a considerable portion of the document on such things as Selection, Use, Care and Maintenance (SCUAM) and detail a number of criteria to enhance the life of the garment as well as assess the "fit for purpose" status of the gear.

So if all else fails it is often your PPE/PPC that will deliver you home after an accidental encounter with the ever-increasing hazards of our job. I have listened to many fine case study presentations delivered by the IAFF at their Redmond's Symposium, researched many incident debriefs and heard a number of testimonials of just how close firefighters have come when the dynamic environment that we deal with changes in an instant. They all emphasis the importance of good "Investment In your Protection" and "Protecting Your Investment".

Stay safe until the next article in this series of "Last Line Of Defence" asks "What Does Your PPC Protect You Against?

For more information, email markgribble7@bigpond.com

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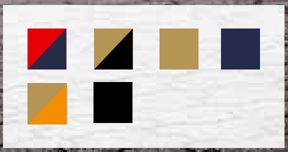

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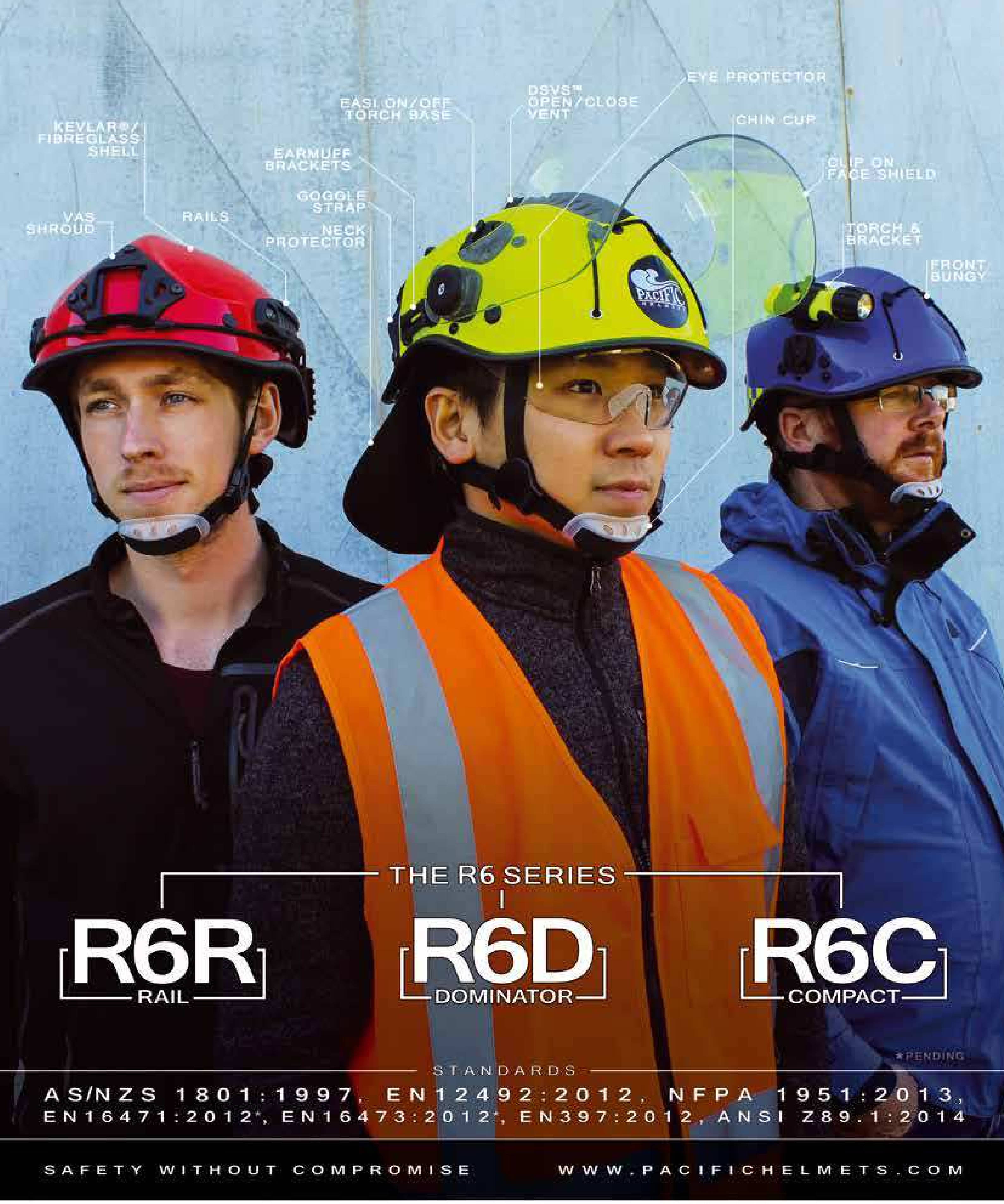

PACIFIC HELMETS

Not all PPE is born equal!

In the world of PPE for structural and bushland firefighting, I am not yet aware of counterfeit PPE, but what we are all increasingly aware of is essential components of PPE for fire fighters are being both advertised and verbally promoted by salesmen in Australia and New Zealand as either compliant or certified to AS/NZS Standards. All this when so far they are patently not capable of meeting our Australasian Standards.

David Bennett

David Bennett founded Pacific Helmets New Zealand in 1982. Originally, the company manufactured motorcycle helmets, but in 1984 the company won a tender to supply the NZFS with structural fire helmets. In 1990 the company won a tender to supply the London Fire Service, and from then on the helmets went international, not just fire, but also for para-medics, rescue, public order and high risk industrial applications. The company holds ISO 9001 certifications and helmets are certified to every reputable international helmet Standard.

However, having said that I see no evidence of counterfeit PPE, I did see at the recent Interschutz exhibition in Hannover Germany, examples of Chinese made structural fire helmets claiming to be certified to EN443:2008. Perhaps only the experienced eye could detect the obvious design inadequacies in these helmets which are obviously of such poor design that there is no-way they could be certified to EN 443. But this should alert us all to the fact that before too long it is likely that we shall see some of these questionable helmets and probably other clothing showing up in our neighbourhoods.

None of this is new of course, and recent examples of deficient PPE are not hard to find. Our Indian market Distributor tells me of a recent Mumbai fire where not only the Chief Officer, but his immediate deputy and another senior fire officer all died of injuries suffered in a major fire. This brought to mind the Mumbai tender that sourced this PPE since it had been our view at the time that it was a completely suspect process. The tender mysteriously disappeared before we could tender product, the products were purchased somehow, and I am told by our very reputable Chinese distributor, that while he made the garments for the samples, his was not the clothing actually purchased! The consequent result is now obvious. We understand an enquiry is underway.

Another example where we did tender helmets was some years ago in Taiwan.

▼ Old hard-hat type helmets are being used for Bushfire fighting, when AS/NZS 1801 Type 3 specification helmets have been available for 20 years.

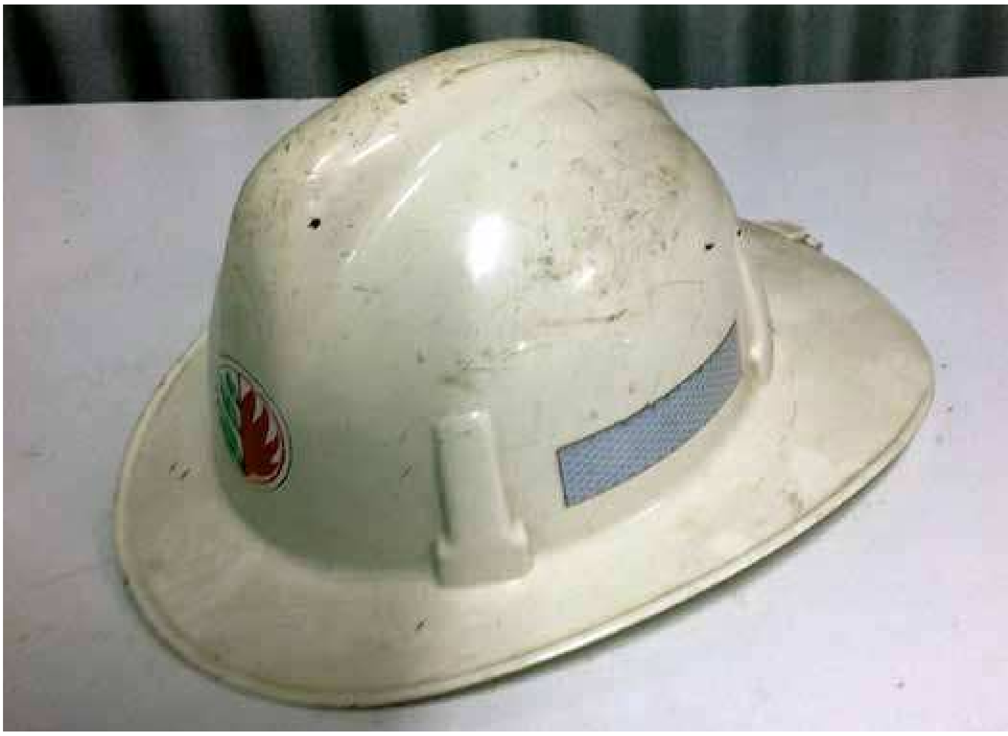

Image courtesy of Pacific Helmets

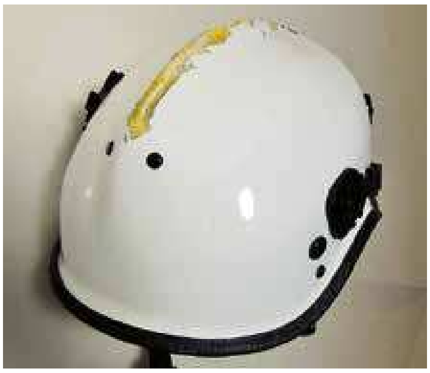

Image courtesy of Pacific Helmets

▲ **Typical of damage to a tested helmet shell after impact tests.**

◀ **This type of cap-style AS/NZS 1801 Type 1 helmet still in use in Australia when Type 3 helmets designed for Bushfire operations have been available for 20+ years".**

The RFP went in, the lowest tender (not from our Distributor) for a complete ensemble of PPE (Helmet, tunic, etc.) was US$420.00. At the time our NFPA 1971 Structural fire helmet would have been quoted at about $200.00 alone, so to meet the tender pricing the clothing would have had to be costed at less than $200. It's difficult to imagine how it would have complied to NFPA!

Back in Taiwan then, the process was that all tenderers were given the chance to participate in a kind of 'Dutch auction' to see if we could beat the lowest bid. Again, I understand the outcome was that it was found fraudulent fabrics had been offered and someone was likely to go to prison.

I fear for the first-responders at the recent Tianjin fire and explosion in North China. What PPE did they have? From social media it appears that most the first responders were killed and the backup responders had little or no appropriate PPE at all!

Our Australian/New Zealand Standards for PPE require our active defence and support now, because they are under threat. There seems to be no willingness to promote both the strength of the work that goes on around writing the PPE Standards, and/or the intestinal fortitude to identify the products and suppliers of PPE that masquerade as compliant, but obviously are not. They never show up with bona- fide laboratory test reports or genuine certification from reputable Notified Bodies.

In the European scene there have been several instances where we have asked our Notified Body to verify the certification of a European manufactured helmet, but there is no formal process to do this. Consequently, when we subject a number of EN 443 helmets claiming certification, they fail important physical destructive tests. There are similar products in the US market claiming NFPA compliance, so Europe is not alone.

Our concern is that some EN 443/2008 helmet suppliers are claiming compliance AS/NZS 4067/2012. Almost without exception, they will fail basic physical and even visual inspection tests. This is a concern because as we watch the advertisements for these helmets, they sometimes imply compliance to AS/NZS 4067, and we understand the salesmen frequently claim the products will meet our Standards. Perhaps it's ignorance of the design requirements for AS/NZS certified helmets?

Certainly the agencies and potential buyers of these products should question the claims carefully. Our reply to these assertions is "we will show you our test reports and certifications, if you will show us yours."

Our staff and Australian agents have pointed out to me numerous other examples of PPE which have been purchased by fire agencies and other industrial plants which do not comply to AS/NZS Standards. The problem in many tender documents is that the specification frequently states "Must be certified to AS/NZSXXXX or equivalent Standard" and this allows the "equivalent" to be purchased.

In respect to AS/NZS 4067, there is no valid equivalent Standard. The NFPA 1971:2013 edition is similar but not identical. EN 443:2008 is not equivalent to AS/NZS 4067/2012, and the committee who worked on this document were at great pains to both strengthen where necessary but not weaken from what the 2004 edition had already achieved. This was because there is ample evidence in both Australia and New Zealand, that where the PPE is correctly worn, the clothing designed for use in our environment provides outstanding protection in all foreseeable circumstances. In my experience, retaining the strengths of the AS/NZS Standards was very much in the mind of the participants in the committee discussions, as was a concern not to over-burden fire fighters with heavy or cumbersome PPE.

The dexterity test in gloves was important, but so was adequate radiant heat protection across the back of the hand while holding hoses near a fire. Some issues like this require compromises. Another issue is structural helmet weight. Most EN 443 helmets now weigh over 1.75 kg, and this is because there is a very destructive test in the EN 443 Standard, that effectively destroys the helmet shell, prior to impact test and penetration test in two locations. European manufacturers have compensated for this by adding bulk to their helmet shells, but Australasian brigades did not want helmet weight to go over 1.4 kg.

In our experience any European helmet that claims a complete weight (helmet, face shield and neck protector combined) at 1.3 kg, needs careful investigation, because it is impossible to achieve this low weight and be genuinely certified to EN 443.

Assuming we are to have AS/NZS Standards, and these documents are developed by and for Australian fire brigades, surely the services themselves would see value in the work? If not, why have AS/NZS Standards?

Defending the veracity and validity of our AS/NZS safety Standards is a challenge that Australian and New Zealand manufacturers and suppliers must face up to.

For more information, go to www.pacifichelmets.com

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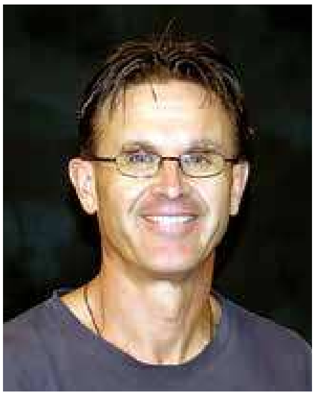
Risk Reduction Gulf: The two sides of Earthquake Disasters

With the tragedy that played out after Nepal's earthquakes this year, there were stories of heroism. There were also stories of people who could have taken proper precautions to save themselves and their loved ones. A larger story is a tale of two realities in relation to earthquakes and loss of life.



Professor Kevin Ronan

The official death toll was just under 9,000 after Nepal's twin earthquakes in late April and early May this year, but for those who work in disaster risk reduction worldwide there is a grim awareness that the number of lives lost could have been a lot more. Tens of thousands of individuals dying was not out of the question, based on previous events – earthquakes are the most perilous natural hazard, causing the greatest loss of life across the globe. The United Nations Office for Disaster Risk Reduction states that in the 10 years prior to 2013, deaths worldwide in earthquakes were more than deaths in all other disasters combined.

But it is also based on a two-sided reality. Developing countries like Nepal bear the brunt of the deaths in earthquakes worldwide. By contrast, more developed earthquake-prone countries, like New Zealand, do experience catastrophic consequences, but do not see death tolls like those in less-developed countries.

Haiti's earthquake in January 2010 was referred to as a mirror image of the two Christchurch earthquakes (September 2010 and February 2011) in seismic terms. Christchurch experienced just under 200 deaths across those two events whereas, depending on estimates, Haiti experienced 50,000–300,000 deaths in the one quake. Other comparisons in similar magnitude events (e.g. Bam, Iran, 2003 vs Paso Robles, USA, 2003) replicate massive differences in the numbers of lives lost.

There really is no question that the built environment in New Zealand and other earthquake-prone developed countries like the USA has been responsible for reductions in lives lost in those countries over time. Equally, governance and a regulatory environment that supports building sturdier structures that can withstand increased seismicity are also responsible.

In the face of complications such as traditional building locations and local attitudes to building and risk-reduction practices, how can risk be reduced to increase lives saved?

It is not an easy answer but, equally, it is a problem that ultimately has some science-based and policy-translated solutions that can lead to advances, including reducing deaths and injuries. Take the example of deaths in storm-related events worldwide. Over time, lives lost in storms and cyclones have dropped significantly worldwide.

One success of the first United Nations-level international disaster risk-reduction accord, the 10-year Hyogo Framework for Action, has been this reduction. For example, over a more extended period, Bangladesh has seen deaths from cyclones reduce about a hundredfold.

The same story can be told in other countries.

Reasons for reductions include the built environment but also, critically, behavioural and socially based solutions. Our and others' research has shown that disaster risk-reduction strategies such as early evacuation are quite likely difficult, perhaps very difficult, to carry out if there is not proper planning, social buy-in and acceptance for such actions. If a community believes such actions are 'over the top', getting buy-in is likely to be very difficult. And, as neighbours watch neighbours, the one family that chooses to enact a safety plan and leave in a false alarm then can become the subject of quiet back-fence talk. Fortunately, as early warning system infrastructure has improved worldwide, so too does it appear that awareness and acceptance of early evacuation in many countries has also improved.

Research on disaster risk-reduction messaging has also suggested ways forward. As a local, anecdotal example, Queensland Premier Annastacia Palaszczuk

Professor Kevin Ronan is a Project Leader at the Bushfire and Natural Hazards CRC and CQUniversity.

Image courtesy of John McCombe, New Zealand Fire Service

▲ **Rubble blocks a Christchurch street.**

emphatically stressed numerous times a ‘single actionable’ set of sheltering behaviours designed to save lives and reduce injuries during February’s Cyclone *Marcia* in Queensland. Research supports the idea that promoting a reduced list of ‘key safety and risk-reduction messages’ is more likely to be taken up and accepted by the public than a laundry list of non-prioritised actions. My own view, from researching in this field for 20 years, but also having been through *Marcia* in my home in Rockhampton, is that the messages on safety-related key behaviours from the Premier, and others, probably saved lives and reduced injuries. We are currently planning research to see if this hunch is supported.

In earthquakes, there is no doubt that saving more lives in many countries will require built environment solutions – sturdier construction that can withstand large-magnitude earthquakes. However, as our analysis of just under 10,000 injuries related to the two major Christchurch earthquakes shows, planning, socially transmitted messages and safety-based risk-reduction behaviours are also necessary. In fact, our analysis suggested about 40% of the injuries sustained during and after the earthquakes were probably preventable through knowledge and enactment of important key disaster risk-reduction messages.

One of these messages is based on the finding that movement during shaking tends to increase risk. Will Swanton, a journalist at *The Australian*, observed both mass panic and mass movement during the shaking in Nepal, including seeing a major risk unfold through people tripping and falling (it was a major risk for injury in both Christchurch earthquakes; getting hit by projectiles and falling objects while moving was another).

Now, it is critical to emphasise that this discussion is not to diminish the cascade of tragic consequences produced by a major natural disaster, both on infrastructure and on people in Nepal, Haiti, Christchurch and elsewhere. No matter how we improve our disaster risk-reduction preparedness and response landscape, disasters will continue to kill and injure people and produce massive consequences. There were, and continue to be, a plethora of consequences in Queensland after *Marcia*.

We need to deal with consequences of disasters, including honouring and remembering those who may not have survived, helping those affected and learning important lessons. However, we need also to acknowledge bona fide progress, even in the face of what can be tragic circumstances. If we do not, we will continue over time to be caught in the same disaster movie and narrative for too long.

The signing off of the new international disaster risk-reduction accord, the Sendai Framework, occurred in March in Japan. As it now includes more countries, it now reflects near international consensus, will and collaboration to reduce risk related to disasters. To do so, a science-to-policy understanding of major challenges related to earthquakes and other hazard types needs to be coupled with learning from failures and from advances. If we as an international community can reduce deaths in storm events, we have the capacity for doing so in other events. This includes for earthquake, the natural hazard that currently takes the most lives.

For more information, go to www.bnhcrc.com.au

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Applying Science and Technology for Disaster Risk Reduction

For nearly 20 years, Pacific Disaster Center (PDC) has envisioned and helped to foster a safer, more secure world – where populations live in more disaster-resilient communities informed by science and technology, and are equipped with the right tools and information for decision-making.

Chris Chiesa

In order to identify and close critical information gaps during times of crisis, PDC helps partners and clients to strengthen disaster management capabilities in numerous ways – conducting risk assessments, deploying early warning systems, providing training, and so forth. The Center routinely partners with others to advance shared goals of enhanced information access, management, analysis, and exchange throughout the disaster management cycle.

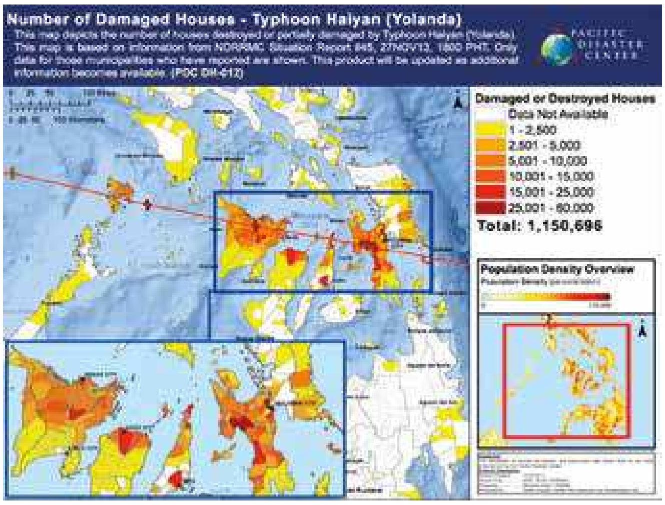
Through these efforts, PDC has developed and operates an integrated multi-hazard disaster monitoring and early warning platform, DisasterAWARE. At its core, DisasterAWARE continually monitors information feeds from authoritative meteorological, geological, and hazard data sources around the globe, automatically processing the incoming information to be visualized and presented to users of the various interfaces the platform supports. Additional hazards that do not meet guidelines for automated processing or that are not available in a form accessible to the platform are manually processed and posted. The results – visualized, geolocated hazards with continual updates – allow users to increase their awareness of risk and ongoing hazards, and make it possible for a wide range of qualified professionals to participate in critical information exchange.

The DisasterAWARE platform is the foundation for a number of applications that are currently used by over a million-and-a-half people around the world. This mature but ever-evolving technology incorporates best practices for data acquisition, hazard modeling, risk and vulnerability assessment, mapping, visualization, information sharing, and much more. The adaptability of DisasterAWARE allows the general public to access the same core disaster information and functionality as emergency managers, while also addressing the complex information and communications needs of those professionals.

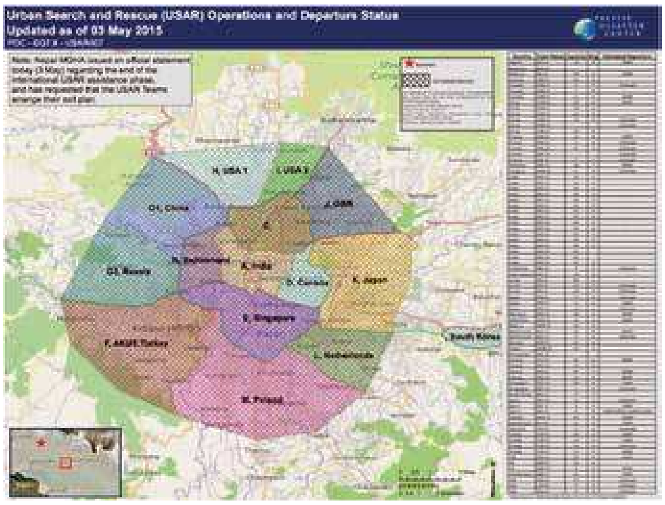
▼ Emergency Operations Center at the ASEAN Humanitarian Assistance Centre (AHA Centre) displaying the Disaster Monitoring and Response System (DMRS), which is based on PDC's DisasterAWARE platform designed to support early warning, multi hazard monitoring, and decision support.

Image courtesy of Pacific Disaster Center

Chris Chiesa is Deputy Executive Director for PDC.



▲ **Following Typhoon Haiyan striking the Philippines in 2013, PDC worked with I/NGO's to help visualize the impacts to the area.**



Images courtesy of Pacific Disaster Center

▲ **Following Typhoon Haiyan striking the Philippines in 2013, PDC worked with I/NGO's to help visualize the impacts to the area (left). Following the 7.8 M earthquake in Nepal, PDC immediately began issuing situational awareness products and continued to support key national, international, and regional disaster management and humanitarian response organizations with decision support for response.**

DisasterAWARE for Professional Emergency Managers

To ensure that during times of disaster, critical information is always available, PDC hosts and operates versions of DisasterAWARE dedicated for use by disaster management professionals. One such system, known as EMOPS (Emergency Operations), provides users with the necessary information and functionality for critical decision-making before, during, and after disaster. This environment offers authorized users information-sharing capabilities for actionable information, such as situation reports and damage assessments, which can be made instantly available to intended audiences.

Similarly, PDC customizes versions of DisasterAWARE to support the specific needs of humanitarian assistance and disaster management agencies. For example, in Jakarta, Indonesia, the Association of South East Asian Nations (ASEAN) has established the Coordinating Centre for Humanitarian Assistance (AHA Centre), as a central location for information sharing and coordination during times of disaster for its 10 Member States. Working with this transnational center, PDC developed and deployed the state-of-the-art Disaster Monitoring and Response System (DMRS) powered by DisasterAWARE to enhance early warning, disaster monitoring, and information sharing capabilities. With DMRS in place, shared situational awareness is provided to ASEAN Member States, and regional disaster resilience is improved through enhanced emergency coordination among members and with the international community.

Other instances of DisasterAWARE have been created for Thailand's National Disaster Warning Center (NDWC), Vietnam's Disaster Management Center (DMC), and Indonesia's disaster management agency (Badan Nasional Penanggulangan Bencana, or BNPB). While multi-hazard in nature, the emphasis in Thailand has been on earthquake and tsunami warning, and in Vietnam on tropical storms and flooding; Indonesia, of course, faces volcanos, earthquakes, tsunamis, wildfires, landslides, and floods, all of which they monitor by way of their national DisasterAWARE called InAWARE.

DisasterAWARE for the General Public

Anyone around the world can access DisasterAWARE by using PDC's Internet-accessible Global Hazards Atlas (atlas.pdc.org). The Atlas offers users a way to view current and historical hazards and numerous demographic, environmental, and infrastructure-related information layers.

Another interface providing access to DisasterAWARE's information is the freely-available mobile application, Disaster Alert. PDC's Disaster Alert is an easy-to-use iOS and Android app with an Atlas-like map optimized for mobile screens. It displays and continually updates active hazards, and it provides on-the-go early warning and multi-hazard monitoring on a global scale.

Hazard information is also actively shared using social media on both Facebook and Twitter @DisasterAWARE.

Global Hazards Atlas, Disaster Alert, and dedicated social media outreach provides a comprehensive solution that can empower individuals and communities to achieve preparedness and resilience goals, both through increased information about risk and vulnerability and through up-to-the-minute situational awareness.

Training, Exercises, and Support

It is important for training and exercise to closely imitate the steps of response during a real disaster. That is why PDC is dedicated to helping partners strengthen resilience through hands-on training, exercises, and event simulation. Using the DisasterAWARE platform in a classroom setting, users can mimic a disaster to test and assess response plans.

PDC involvement in exercises can range from scenario development to exercise facilitation and evaluation, as well as work on hazard-specific mapping and modeling. The Center routinely participates with government agencies and military operations throughout all phases of exercise play, helping officials to rehearse response to events potentially causing significant damage or loss of lives and livelihoods.

Additionally, DisasterAWARE is used in many emergency operations centers (EOC) around the world, both for training/

exercise and for response and recovery. DisasterAWARE is used to provide near real-time display of hazards and local-level GIS base data, and to supply reliable real-time hazard information, perhaps preventing a hazard from becoming a disaster or supporting response such that a disaster does not become a catastrophe. Through whatever pressures disaster managers face, DisasterAWARE systems continue providing a common operating picture, and act as a communication hub, promoting efficient interagency information sharing.

Frequently, PDC receives requests to produce particular situational awareness products for agencies of the U.S. and foreign governments, as well as UN offices and intergovernmental and nongovernmental organizations (I/NGO).

DisasterAWARE Saves Lives

As early as 1995-96, PDC was working to provide needed services to Hawaii State Civil Defense. Almost immediately, the mission of the Center began expanding and came to include the entire Pacific basin. Nearly fifteen years ago, the foundational technology that became DisasterAWARE was developed by PDC and deployed in the Caribbean. It was no accident when PDC’s technical achievements, network of data-providing partners, and growing resource of feedback from professional-users reached the point at which a fully integrated Disaster All-hazards Warning, Analysis and Risk Evaluation – DisasterAWARE – became possible.

That took place as PDC joined countless other agencies in respnding to The Great Sumatra Earthquake and Indian Ocean Tsunami (26 December 2004). U.S. Senator Daniel Inouye asked after Hurricane Iniki devastated the island of Kauai in 1991, “Couldn’t current technology have reduced this disaster in Hawaii?” The result of the Senator’s query was PDC. Then, in the aftermath of the Indian Ocean disaster that killed at least 230,000 people, PDC asked, “Couldn’t our technology be customized in such a way that the impacts of such disasters can be reduced around the world?” The result this time was DisasterAWARE for the National Disaster Warning Center in Thailand, and the rapid globalization of PDC products and services.

What we might think of as “ordinary” hazards, as well as disasters on all scales are tracked in DisasterAWARE and professionals worldwide use the various interfaces to manage response, recovery, mitigation, and preparedness.

DisasterAWARE has attracted a lot attention for its contributions to the response and recovery phases of 7.0 Magnitude earthquake in Haiti (2010); the 9.0 M earthquake, tsunami, and nuclear hazard in Japan (2011); Super Typhoon Haiyan in the Philippines and Vietnam (2013); and the 7.8 M earthquake in Nepal (2015). On the other hand, there are also regional, national, and local authorities around the world using the system to make decisions and determine actions when faced with storms, wildfires, floods, and other hazards. Similarly, there are those 1.5 million members of the general public who monitor hazards for themselves and their families using the web-based Atlas and mobile Disaster Alert, also powered by DisasterAWARE.

Anyone interested in finding out more about PDC products and services or who wants to explore PDC support for an organization can contact PDC at info@pdc.org.

For more information, go to www.pdc.org

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International Wild Fire Conference to be held in Asia for the first time

Efforts to Prevent Disasters by Sharing Fire Management Model

Around the globe, 3 to 6 million square kilometers of vegetation are affected by land-use fires and uncontrolled wildfires annually. It is reported that more than 723,000 people were evacuated in wildfire situations in 32 countries and total of 16,100 houses destroyed between 2011 and 2014. Comparing with the statistics of the world as well as major fire affected countries, the damage from forest fires in the Republic of Korea is relatively small. When considering this fact, what does it mean that Korea hosts the biggest wildfire related international event, the 6th International Wildland Fire Conference (IWFC)? What will Korea be able to contribute to the international community in terms of wildland fire management?

In Korea, because of topographical condition and landscape of territory, it is usually said 'forest fire' or 'mountain fire' (*sanbul* in pronunciation of Korean language) when indicating fire in open area excluding construction fire. 'Forest Fire' is also a common term used in Asian region. The responsible government agency for open-area fire is the Korea Forest Service (KFS) which administers forest policy establishment and implementation.

The KFS had bid for hosting the conference since the 4th conference which took place in Seville, Spain in 2007. Competing with the major fire affected countries that also bid for holding, its endeavor becomes fruitful to host the 6th conference this year. The reason it has desired to offer the platform in which global fire issues are discussed derives from several harsh fires Korea had to encounter scores of years ago and ongoing exertions to strengthen fire management policy.

Many Korean people cannot forget the fire in Goseong County, Gangwon Province in 1996. About 37.62 square kilometers of forest were burnt down. After 4 years later, more severe fires simultaneously affected 5 locations in the eastern part of Korea from 7 to 15 April, 2000. Between Goseong County in Gangwon Province and Wuljin County in Gyungbuk Province, 237.94 square kilometers of forests were burnt out with the record of 2 fatalities, 15 injuries, and 491 destroyed houses, and many livestock were killed by fires during this period.

Fire incidents in the east part of Korea have mainly occurred by characteristic of natural disaster with combined factors of topography and weather condition. But it was also true that our incident management system to respond to disasters was not prepared enough to control rapidly spreading fire.

2015 세계산불총회
INTERNATIONAL **WILDLAND FIRE** CONFERENCE
PYEONGCHANG, KOREA, 12-16 October 2015 www.wildfire2015.kr

▼ **Alpensia Resort, Pyeongchang County, Gangwon Province, Republic of Korea: Venue for the 6th IWFC.**

Image courtesy of the IWFC 2015

Conference Topics

Plenary Sessions

1 Legacy of fire
2 Community and wildland fire
3 Towards a cohesive global fire management strategy
4 Application of technology to wildland fire management
5 Protecting the global natural and cultural heritage from fire

Parallel Sessions

1 Wildland fire and ecosystems
2 Wildland fire governance / policy
3 Advanced technologies for wildland fire management
4 Wildland fire and society
5 Wildland fire safety and risk management
6 Firefighting in Incident Command System (ICS)
7 Aerial firefighting and resource sharing / International Cooperation
8 Knowledge from country experience
9 Fuel Management

Image Courtesy of the IWFC 2011

▲ **Plenary session at the 5th IWFC held in South Africa in 2011.**

After the chain of costly lessons, the Korea Forest Service (KFS) has made investments at national level to cope with fire disasters in a swift and systematical way. Multilateral implementations including fire prevention policy, development and upgrade of suppression equipment, continuous education and training, and reinforcement of the system in local governments have been emphasized and the endeavor continues until now. As the outcome of the efforts in the public sector, there were no deadly fire records since 2005.

The model of Korea may not be adopted in all countries in the same manner. Weather condition, climate zone, and landscape are very different from one another. Area size of forest or land also varies. The causes of fires and their spreading status are affected by countries' own natural and social factors. Each country's individual socio-economic environment makes large difference in interest and concerns in financing for fire management. In developing countries, crop cultivation needs fire. In a country with vast territory, there are many cases that a fire outbreak is not detected for several days. Sometimes, natural resources and cultural heritages are threatened to be burned up with no means of prevention and control methodology.

In this regard, it is apparent that sharing experiences and knowledge with all interested parties can help respond to disastrous fire outbreaks around the world. It is the major objective of the IWFC to share perspectives and policies on fire.

The world has given attention to the outcome of Korea's Forest Rehabilitation Projects for reforestation launched in 1973. The country is now sharing the valuable experiences with partner countries in Asia and Latin America. Among the efforts of cooperation, its model for various aspects of fire management including fire prevention, early detection, fire control and suppression, and rehabilitation has also been recognized to the international community. Hosting the conference will be another big step to join forces with the world in natural conservation and adaptation to climate change.

In the exhibition running parallel with the conference, Korea hopes participating companies get an excellent opportunity to showcase their cutting edge technologies and innovations, and broaden their market. Also, it expects the KFS's technologies can be introduced to abroad.

When forest officials from abroad visit the Central Situation Room in Forest Fire Prevention and Control Division of the KFS, they show big interest. Hopefully, Korea's systems such as the Forest Fire Control System, Korean Mountain Fire Pumping Suppression System, Fire Engines, and Forest Fire Incident Command System can be adopted in many countries interested.

There are less than two months left before the conference. Korea would like to thank all interests and concerns from experts who will make presentations in sessions, and willing participation and devotion from private sector. And it appreciates students' participation in the Youth Program where young scientists can present their theses while competing with friends studying the same field but from different countries and environments. Don't miss this 4-year long-awaited gathering to build a safer world.

For more information, go to en.wildfire2015.kr

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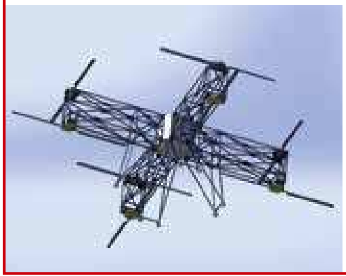
Tekmax Telecom

The Korean expert group specialized in natural disaster prevention, engages in the full extent of process regarding development and management of intelligent systems (both hardware and software) that capture signals and deliver the data to relevant parties. For instance, if a forest fire is caught on CCTV, the system will be activated to provide warnings to disaster information centers throughout the nation via high-speed communications networks. The system assists to figure out the nearest fire department and make sure the FD takes immediate actions for fire suppression. Tekmax Telecom is a leading company that has been committed to the development of core technologies involved in the example explained.



The expert group has contributed to development of data processing system for meteorological analysis, modernization of integrated wireless networks at over 200 forest sites, and scientification of fire suppression tactics using air vehicles. Tekmax Telecom rises in many related partners' estimations for the expertise and passion towards advancement of disaster prevention systems in the world.

The company has been occupying itself with a deep study of new ways to enhance fire suppression process. Tekmax Telecom will proudly introduce a large-sized multicopter named as ELECBIRD™ Wing-K. This unmanned drone-type vehicle is the outcome of 2 years of intense research and development. The vehicle is capable of uninterrupted flight for 40 minutes, payload up to 60kg, imagery transmission, and positioning system. With innovative features, the multicopter is expected to be used for various emergency situations and take the assistance operations to a whole new level.

www.tekmaxtele.com

Simplex Aerospace

Simplex Aerospace Fire Attack systems for helicopters are regarded worldwide as a critical tool in aerial firefighting missions. Simplex Fire Attack systems are trusted by OEM's, private operators and government firefighting agencies for their durability, reliability, efficiency and safety. Simplex Aerospace is committed to producing the most advanced certified aerial firefighting systems on the market with the features and quality customers demand. All Simplex Fire Attack systems are made for strong yet light-weight composite material and aviation grade components. Simplex holds over 150 domestic and international certifications for its systems.

Simplex Aerospace manufactures and certifies each Fire Attack belly tank system to specific helicopter modes. Supported helicopter platforms include, Bell, AgustaWestland, Airbus Helicopters, Kamov, and AVIC.

www.simplex.aero

The Korea Forest Service (KFS)

Forest, accounting for 64% of the total land, has been the basis of livelihood and culture throughout the long history of Korea. It provides not only a variety of forest products and medicinal herbs but also a resting place for mind and body.

Preventing forest fire, a general term for wildland fire in Korea, and reducing its damage are the main policies of the Korea Forest Service (KFS), since forest disasters directly affect the lives and property of the people.

The KFS makes every effort to realize the vision of 'creating a green welfare nation where forests bring happiness to our people' through a prompt and efficient prevention-control-restoration system.

As the host organization of the 6th International Wildland Fire Conference, the KFS will gladly provide an arena to share and discuss better fire management strategies across the world.

globalkfs@korea.kr
english.forest.go.kr

산 림 청
KOREA FOREST SERVICE

Inforest

Inforest Srl is a Argentine company, created by firefighters, who designs, manufactures and sell, solutions for emergencies management. We are specialized in forest and rural fires.

We have a R&D department who researches and develops comprehensive solutions, which are produced in our factory and distributed around the world. We are leaders in innovation and we mark tendency in our market, being our products often copied, but never at our level in quality, support and functionality.

We cover all the needs of equipment, components and services needed to successfully develop the Integrated Fire Management, with Personal Protection Equipment, Hand Tools, Powered Tools, Slip On, Equipment to pump water and complementary elements.

We also design special products for detailed problems for agencies in different countries, under license or confidentiality contracts, like backpacks, day packs, high technology rural fire trucks or special slip on.

www.inforest.com.ar

International Association of Wildland Fire (IAWF)

The International Association of Wildland Fire (IAWF) is a non-profit, 501(c)(3) membership association founded to promote a better understanding of wildland fire; built on the belief that understanding this dynamic natural force is vital for natural resource management, firefighter safety and welfare, and harmonious interaction between people and their environment.

The association is dedicated to communicating with the entire wildland fire community and providing a global link for people with shared interest in wildland fire and comprehensive fire management.

With over 2 million men and women involved in all aspects of wildland fire worldwide, the IAWF's focus is to be the foremost source for local to global scale scientific and technical knowledge, education, and networking and professional development for its members and collaborative partners.

Visit the IAWF at Booth A19 to learn about membership, our publications, our initiatives and our conferences.

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Conair Group Inc.

Conair Group Inc. is a privately-owned Aviation Company specialized in the provision of aerial fire control services and products. Conair is headquartered at the Abbotsford International Airport in British Columbia, Canada.

Conair has provided world class Aerial Forest Fire Management services to a wide variety of Domestic and International Forest Protection Agencies for over 45 years and continues to work closely with numerous Protection Programs to find innovative solutions to economic, operational and technical challenges. Conair's corporate and business strategy is singularly focused on providing Aerial Forest Fire Management Services and Products. Conair has developed and introduced a multitude of next generation Airtanker and Birddog aircraft for leading our customer air attack programs in effectiveness and efficiency.

www.conair.ca

NOVELTIS

NOVELTIS is a French private company that was created in 1998. We perform innovative scientific engineering studies and implement customized end-user solutions in the fields of Space, the Environment and Sustainable Development. NOVELTIS' staff have strong expertise in: remote sensing data processing (satellite and aerial data), environmental modelling (fire, weather, vegetation and ocean), geographic information systems and integrated decision support systems.

NOVELTIS focuses its activities on innovation, in close relations with international research laboratories. Our company supplies end-to-end services to governmental bodies and industries, including emergency management stakeholders. We also coordinate and participate in large-scale European and international projects.

NOVELTIS is certified to the ISO 9001(2008) standard and has been granted "Confidential-Defence" status by the French Defence Ministry.

NOVELTIS provides innovative operational services supporting tactical firefighting. Our most recent service, TechForFire, offers real-time information concerning:

- The current situation of the fire theatre: precise positions of the active fires, burnt areas, firefighters, and elements of interest;
- The risk forecast for the coming hours: forecasts of the fire propagations and evaluation of vulnerable areas.

The service is based on the latest scientific and technical advances in aerial and satellite monitoring as well as real-time fire propagation modelling and risk forecasting.

The TechForFire service is accessible via four means:

- 24/7 secure user-friendly interactive web application.
- Mobile application for smartphones and tablets.
- Cartographic PDF output, suitable for hardcopy.
- GIS layers for use in 3rd party GIS software packages.

contact@noveltis.fr

International Tropical Timber Organization (ITTO)

The International Tropical Timber Organization (ITTO) is an intergovernmental organization promoting the conservation and sustainable management, use and trade of tropical forest resources. Its members represent the bulk of the world's tropical forests and of the global tropical timber trade. ITTO develops internationally agreed policy documents to promote sustainable forest management and forest conservation and assists tropical member countries to adapt such policies to local circumstances and to implement them in the field through projects. In addition, ITTO collects, analyzes and disseminates data on the production and trade of tropical timber and funds projects and other actions aimed at developing industries at both the community and industrial scales. Since it became operational in 1987, ITTO has funded more than 1000 projects, pre-projects and activities valued at more than US$400 million.

itto@itto.int

Mercedes Textiles Limited

Backed by over 35 years of manufacturing firefighting innovation, Mercedes Textiles Limited provides premium fluid delivery systems. Mercedes is widely recognized throughout the world as the premier trendsetter and supplier of municipal, forestry, snow making and other industrial fire hoses, pumps and related equipment.

Since inception in 1978 and the holder of over 60 patents, Mercedes has grown into three facilities producing the finest, most durable and highest performing fire hose products and portable fire pumps sold worldwide. Mercedes remains committed to improving, redefining and transforming the firefighting industry. Combining these elite grade products, continued innovation, proactive thinking and unrivaled service are the qualities that set Mercedes Textiles Limited apart from its competition.

www.mercedestextiles.com

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The Gangwon Province

The Gangwon Province is at the center of Baekdu-daegan, a major range of mountains forming the backbone of the Korean Peninsula. The eastern region runs along the coast and the northern region lies face-to-face with the Demilitarized Zone. The province is easily vulnerable to wildland fire due to the warm and dry weather and strong Foehn winds in spring. As a local autonomous entity which deals with a large number of fires every year, Gangwon is selected as the co-host of the 6th IWFC.

eng.gwd.go.kr

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GANGWON PROVINCE

Burnology

Burnology develops innovative solutions to complex bushfire and emergency management problems. Our flagship product, Burnology | Unite sets a new standard in emergency management communication and coordination. It is a map centric, cloud based, real time mapping, collaboration and information management system for use by office staff (including Incident Management Teams, prevention officers and Executives) and field staff (including incident responders and field officers) before, during and after emergency incidents.

There are shared maps which office and field staff may add to or modify and observe each others changes in real time. This feature enables real time spatial collaboration between the office and field and real time tracking of field resources. Unite also includes logs and has messaging and tasking functionality. The system facilitates the collection of local knowledge during normal daily activities that is automatically and spatially available in the event of an incident.

While currently configured for bushfire, the system can be quickly configured for any event or emergency. The user interface is simple with minimal training required. The system can be used by individual units/brigades but is powerful enough to automatically compile data from multiple shared maps to provide agency-wide situation reports on incidents or plans making it suitable for enterprise applications. Unite works on any web enabled device including computers, tablets and smartphones without the installation of software. Visit us at booth A17 at the IWFC 2015 conference for a 30 day free trial.

www.burnology.com

Insight Robotics

Insight Robotics, a technology company specializing in data visualization and risk management over large areas of land, has developed a revolutionary new solution capable of detecting fires the instant they break out.

The Insight Robotics Wildfire Detection System is the only system capable of detecting a single tree on fire up to five kilometers away, allowing fires to be extinguished before they can spread out of control. Specifically designed for cost-efficiency, durability and reliability, the system can protect an area for as little as US$2 dollars per hectare per year, safeguarding trees, property and lives and reducing the cost of fire suppression and damages.

The system is comprised of a network of automated InsightFD1 robots, all connected to a central control room. The robots combine a thermal sensor with geospatial intelligence to scan for fire and report its location while minimizing false alarms, leading the industry in detection time and location accuracy. The robots also provide a real-time video feed of the fire area and micro-weather data for response coordination.

Currently deployed to protect over 330,000 hectares of territory, the system has a detection track record of 100%. In Jinan City, China, the system detected all fires that occurred in 2014, allowing each outbreak to be suppressed by a single fire truck. At an official demonstration in Guadalajara, Mexico, attended by four forestry agencies, all fires were found within 15 minutes, four of those with an average time of under five minutes.

www.insightrobotics.com

WATERAX

WATERAX, a time-honored company, is inventing, making and delivering dependable water handling equipment for firefighters, agencies and governments dedicated to fire control and wildland protection.

Building on Watson Jack & Co. Ltd.'s entry into the fire control industry in the 1920's and best known for the MARK-3, the benchmark in the high pressure portable centrifugal pumps, WATERAX offers a complete line of high-pressure centrifugal portable lightweight fire pumps and water-handling equipment for use in wildland firefighting operations and other applications when you need to move water over long distances or to lift water at elevation.

WATERAX products are characterized by multi-stage centrifugal pump ends designed to move water while generating high-pressure to meet the difficult requirements of wildland firefighting.

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Positive Pressure Attack – The Rules of Engagement

Early in our careers we are taught that our fire attack should be done in coordination with ventilation. We were convinced, and rightly so, that ventilation provides a safer environment for us and for potential victims. Decades pass and what appear to be small changes occur. Fire loads, construction, energy efficiency attics, solar power, fire department resources, Personal Protective Equipment, (PPE), fire equipment and the fire service culture are some of these changes. None of these events come in with a bang, they are slow and on a daily or yearly basis may be unrecognizable.

Kriss Garcia

Kriss Garcia is fire chief of American Fork (Utah) Fire & Rescue. He retired as a battalion chief from the Salt Lake City Fire Department, where he worked for over 25 years. He's written a number of training materials in regard to Positive Pressure Attack and is considered to be one of the biggest pioneers for the tactic. He has also written a number of articles and has held seminars and training classes on positive pressure around the US for many years.

If you took a snap shot of the fire service 30, 50 or 100 years ago and put it next to the environment of which we operate in today; the change is astronomical. We know that change in the fire service comes slow, yet change we must.

For over 30 years many fire professionals have been safely using fans to ventilate buildings in coordination with the attack. I know without any shadow of doubt that when used correctly at fires and buildings, which are conducive, that there is no safer fire attack for civilians and firefighters.

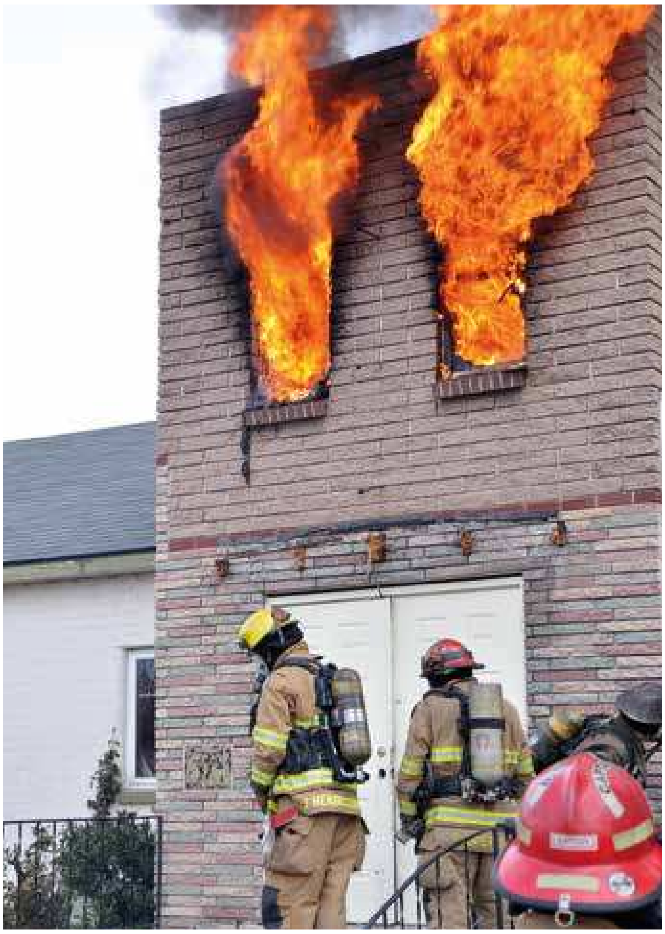
With Positive Pressure Attack (PPA) not only are firefighters not in obscured, flammable, carcinogenic environments but victims who may be in areas that are survivable on our arrival are also benefited. In order to consistently use this safe and predictable fire attack, we have to wade through years of myths and under-educated false starts and provide a foolproof way of implementing this tactic when it makes sense to do so. We will call this effort; The Rules of Engagement.

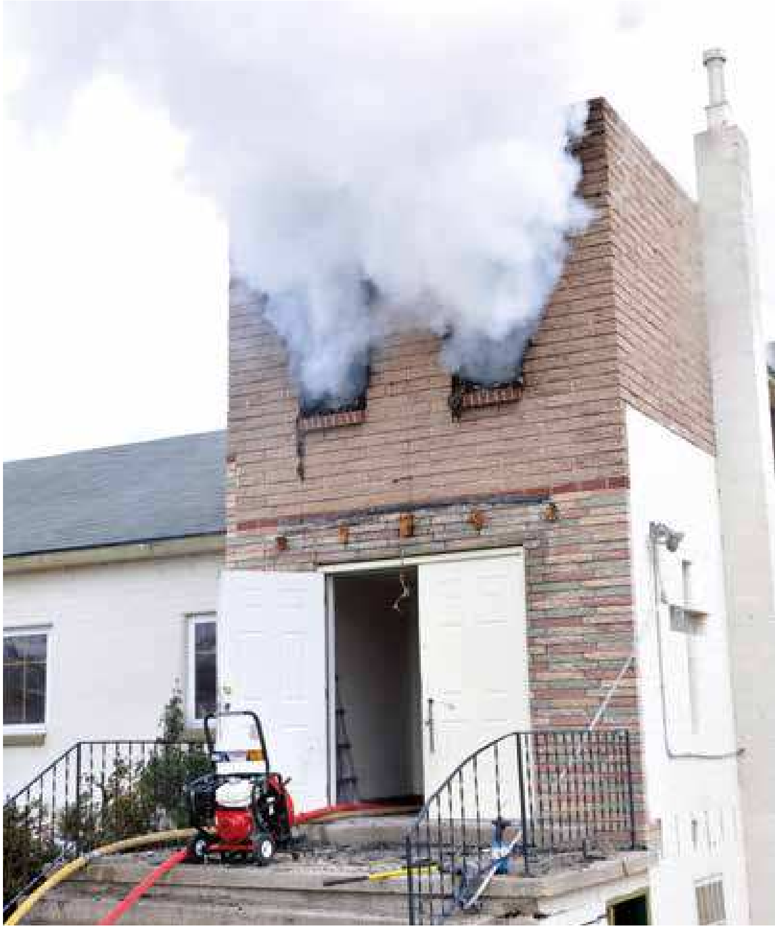
First some ground rules. Positive Pressure Attack (PPA) is a coordinated fire attack where fans are used to assist in controlling the fire. Positive Pressure Ventilation (PPV) is the use of fans to remove the products of combustion after fire control.

For interior crews, successful and safe fire attack is much less about fighting fire than it is about fighting smoke. We spend an inordinate amount of time protecting others and ourselves from fire when we know what hampers our ability to operate inside of a structure fire and what kills civilians is most often times not the fire but the smoke. More accurately, civilians succumb to the high levels of carbon monoxide and other toxic chemicals as they try to escape the very unfamiliar highly obscured Immediately

▼ The High pressure area created by the fire is exhausted through windows where there is no chance of victim survival to the lower atmospheric pressure.

Image courtesy of Tempest





Images courtesy of Tempest

Dangerous to Life and Health, (IDLH) conditions. As for us, without ventilation we are operating blind in a highly volatile often times unpredictable, toxic atmosphere of potential energy mixed with substantial carcinogens.

Most reports demonstrate that vertical ventilation, while effective, is highly dependent upon a tactic that requires extensive resources and takes several minutes longer to accomplish than it does to extend fire control lines. Therefore firefighters and civilians are not reaping all the benefits of operating in a properly controlled ventilated fire. Instead they are in a non-ventilated, volatile atmosphere that when water is applied causes increased temperature, increased carbon monoxide and decreased oxygen at the victim level in the structure.

Gas cooling while effective, requires specific nozzles and pressures that often times are not common place and also places firefighters and victims in a precarious atmosphere where conditions for those not protected to the same level as us, may decrease the survivability. Imagine what we could accomplish if we could remove the gases and associated obscuration as we entered?

The Rules of Engagement:

Structure:

The structure has to have windows or doors that can be quickly opened from the exterior in order to use PPA. Unlike vertical ventilation, with PPA the fire can occur on any level of the structure and still have positive results as long as there are windows present. Adequate exhausting is relative and will be talked about later as to when you know it is adequate. Basically large fire=large exhaust. Small fire=smaller exhaust. PPA's main objective is about being able to remove the un-survivable environment away from the high pressure or clean side of the fire our crews are in, towards the lower atmospheric pressure which we have already determined to be non-survivability or the dirty side of the fire. As a rule of thumb, windows where the immediate area behind are non-survivable can be removed, or most often times have already failed. Several studies summarize window failure to begin when there is a difference in temperatures of greater than 370 C on either side of the glass.

▲ Structure has to have windows or doors for quick exhausting. Firefighters obtain quick control without facing the obscuration or lethal combustible Products.

Fire conditions:

Fires should be in the free burn stage. Free burning fires require approximately 21% oxygen. The fan simply provides the same percentage of oxygen that already exists. Studies show that the temperatures after the fan is introduced and the fire is cleaned up, will increase slightly above the original levels that you have already determined are well beyond the threshold of survival.

The Procedure:

1. Ensure structure has windows/exhausts on the fire floor and that there is a free burning fire.
2. Identify windows or doors where there is a high probability of no one being alive in that area of the structure.
3. If substantial winds are present, do not take exhausts on the windward side of the structure.
4. Position and start a fan at the attack entrance. Do not direct the airstream into the structure until exhaust is ensured.

◀ **Fire exhausting from a non-survivalble room is shown as the crews observe the area above the cone of air to ensure adequate exhaust is in place.**

Image courtesy of Tempest

5. Ensure attack lines are ready to make entry.
6. Ensure ample exhaust is made.
7. Turn fan into building.
8. Before entering, observe the area above the cone of air, we will call this the barometer, and ensure it is clearing. If this area does not begin to clear within 15 – 30 seconds, there is not enough exhaust on the dirty side of the fire to use PPA.
9. If exhaust is adequate and lines are in place the fan can be turned into the building and entry can be made.
10. Enter the structure a short distance and position the crew so that they are not interfering with flow of air.
11. As interior conditions begin to become less obscure, cooler and more survivable on the clean side of the fire, crews can then advance to and extinguish the fire.
12. When applying water or moving down small corridors, stay low to maintain the benefits of the high-pressure area you created on the clean side of the fire.
13. If you are ever interior with a fan operating and conditions do not obviously clear, remove the crew from the structure and re-evaluate.

Amplification of PPA:

1. Fire has and always will increase the pressure in the area of ignition due to increased temperature.
2. Fire has and always will burn from an area of higher pressure to an area of lower pressure.
3. Fire has and always will move to an area/opening with the least amount of resistance.
4. Fire burning yellow, red and orange has and always will burn at approximately 1000 C.
5. Fire has and always will use the 21% oxygen available in the atmosphere when it is free burning.
6. Fire has and always will continue to move in the same direction given the affecting conditions remain static.
7. Fire has and always will kill any civilian who is in the room or area that is hotter than 100 C and full of lethal levels of carbon monoxide.
8. Fighting fires in buildings where we can see has and always will be safer for firefighters and victims.

Survivability:

Recent studies demonstrate that fires which, were well above the lethal threshold in regards to temperatures, degraded to a few hundred degrees Celsius when no fresh air was available. Once a fan was introduced and exhausts opened, temperatures again arose to and slightly beyond, the earlier non-survival thresholds.

Just because you take a fire area with thousands of parts per million of carbon monoxide and temperatures in excess of 1000 C and drop it to 200 C, that does not equate to resuscitation. Conditions near the fire have not been survivable by any civilian just a few minutes after the fire has started. A well-seasoned firefighter explained this fallacy in an analogy. He stated, “It’s like drowning in 10 or 20 feet of water, regardless your still dead”.

Firefighter Safety:

The goal in PPA is to allow the fire and associated high-pressure to move away from attacking crews through areas that are already non-survivable towards the lower atmospheric pressure through exhausts the fire or our crews have created. The PPA does not have to beat the pressure that the fire is creating; it only has to be higher than the atmospheric pressure outside the structure.

I have never had or heard of a firefighter falling through a flowerbed while performing PPA. With PPA, firefighters are also not subject to a completely obscured, flammable environment with high levels of carcinogens and toxins. We can see where we are going and never go beyond an area that the fan can clear. We know that if we use PPA and the interior environment is not clear, that something in the procedure is not as it should be. When these conditions are present do not advance deeper into the structure; instead reevaluate your circumstances from the exterior until such time that you can determine what portion of the attack is not as it should be.

Not only is this attack much safer for firefighters today, it is much safer for them tomorrow. We all know of too many tragic circumstances where friends who have worked in the business for years have contracted career and life ending cancers. Removing the carcinogen-laden atmosphere from the interior as firefighters approach makes tomorrow much safer for all of us.

The above conditions have been proven time and time again over 30 plus years to provide firefighters with a safe and predictable fire attack. Yes, there are a few assorted “what if’s” that cannot all be explained in this brief article, but Despite these infrequent circumstances, keeping to this procedure will provide your department with another option when it comes to attacking fires of today.

For more information, email garciakriss@gmail.com

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With the greatly increased use of ventilation technology, the leading manufacturers have boosted their research and development efforts to provide the end user with the most efficient and reliable equipment. In this Buyer's Guide we highlight the latest offerings from the worlds leading suppliers.

VENTRY Solutions

VENTRY® Fans are inherently safe, very efficient, and versatile, with three adjustable legs for positive pressure attack and ventilation. They overcome common obstacles that handicap conventional blowers. Legs allow for quick placement wherever they are most effective, far back from the entry and out of the way of crew and victims. The fan and its airstream are lifted above obstacles (stairs, hills, snow…) and there is no shadowing of the air stream by the ground.

All the benefits of VENTRY Fans equate to safety, versatility and ease of use. They feature state-of-the-art Safety Propellers, pressure-bonded with Kevlar and fiberglass for proven safety. They deploy fast, with one person and no lifting required (see video of demo by pregnant woman on ventry.com). They are light weight, quiet, and low in emissions. Legs allow you to tilt, aim and stabilize with the turn of a knob. VENTRY Fans can be positioned for best performance, not as a reaction to the terrain or obstacles. GFCI-compatible three-phase electric models are available. The fans won't walk or rotate and they have vibration dampening feet with tough tread for aggressive grab on slick and slanted surfaces.

Options include Entry Point Lights (halogen and LEDs), Wheels and Skids, and more. All fans have side handles for easy 1- or 2-person carry. With 14-inches between propeller and ground, there is no intake of foreign matter so crew isn't blasted with sand and the fan won't plug with leaves. Robust, solid aluminum legs are guaranteed not to break or bend and provide a solid 3-point stance throughout full range of leg extension.

VENTRY Fans were first made 26 years ago and continue to be made by the first responders of Ventry Solutions, Inc. in Hauser, Idaho, USA.

For more information, go to www.ventry.com

Ramfan Positive Pressure Ventilators

Euramco Safety Worldwide, designs, engineers and builds Ramfan ventilators for firefighting markets worldwide. Choose from a wide selection of gas, electric and water fans.

Ramfan PPV gas or electric fans are available in sizes from 16" to 21". Some agencies need a fan that's placed close to an opening such as row houses and apartments. The GF185 18" is a popular model for this application. But if you need a fan that can be setback from the opening, consider the GX gas-powered or the EX electric fans that come with PowerStream. This technology combines an integrated impeller and rigid stator vanes that focus the airstream. This allows fans to be set back 8' to 16' from an opening allowing easy ingress and egress. It also reduces noise inside the structure.

With the ongoing creation of warehouses, big box stores and high-rises, you need a much more powerful blower to clear large volumes of air. Ramfan makes fans for Large Structure Ventilation (LSV) because you can't remove smoke from a large fire with PPV fan. These 21" to 28" gas-powered units come equipped with the PowerStream air straighteners. The LSV blower is like a large diameter hose that delivers much more water than a standard diameter hose.

The top-of-the-line VX700 is a trailer-mounted unit that creates 60,250cfm. It's easily moved by two men over curbs, steps and ramps, and can be quickly placed directly in front of an opening. What's more, it's affordable. Few departments can justify the huge monstrosities that are hard to move and pricey. You can get 6 of the VX700 units for the price of ONE of those monster fans. This means you can service a larger geographic area and you can distribute units to multiple incidents simultaneously.

Finally, if you need a fan for rescue operations in hazardous locations, check out the Ramfan explosion-proof line. They're intrinsically safe, fully ATEX certified fans that can be used in explosive environments. This keeps you free of the chain of liability should there be an accident.

For more information, go to www.euramcosafety.com

Dafo Brand AB

The Swefan 21" is the latest model of PPV fan to be manufactured by Swedish Company Dafo Brand AB. The new model fan is a result of numerous enquiries from Dafo Brand's customers asking for a high quality ventilation unit that could still perform to a high capacity but slightly smaller in size so that it could conveniently fit on fire trucks and other spaces. The result is a tremendously reliable unit. It has a direct drive and is powered by a Honda engine. The Swefan 21" runs with the minimum amount of vibration and remains stable on most surfaces, it can also be tilted into 5 different angles. Large wheels and a handle ensure easy transportation and manoeuvrability.

The Swefan 21" can also be fitted with various accessories which includes an exhaust hose, door adaptor as well as a hi-expansion foam adaptor "Skumrask" making the Swefan extremely versatile and more than just an air mover.

For more information, go to www.dafo.se

Super Vac

Super Vac continues to innovate their PPVs in order to make them more user-friendly. The new, patent pending, Valor Series PPVs are the latest design from Super Vac. With a contemporary new look; these frames are constructed of 1.25" aluminum tubing in order to reduce the total weight by nearly 15 percent (frame weight reduction is 35%).

An intuitive step-action tilt mechanism allows the shroud to be tilted at seven different angles. A bigger forward tilt allows easier access to motor controls and stands taller for easier transportation. The StreamShaper guard comes standard for longer setbacks (can also be ordered with Air Cone Guard) and the easy access shroud allows users to quickly attach flexible duct.

Although lighter and more mobile, this PPV does not sacrifice any of the toughness Super Vac is famous for. The shroud and motor stay inside the true roll cage, protecting them from possible damage. The blade is always aluminum in order to hold up in the high radiant heat of structure fires. Large, flat-proof, rubber tires require zero maintenance and make it possible to go up and down stairs and roll over charged hose lines.

The Valor Series PPVs are available with the same quality motors and engines that were available on the 7 Series PPVs. Whether you are looking for an electric single speed, hazardous location, or variable speed motor, or want a trusted gas engine from names like Honda or Briggs and Stratton, Super Vac has a Valor PPV for you.

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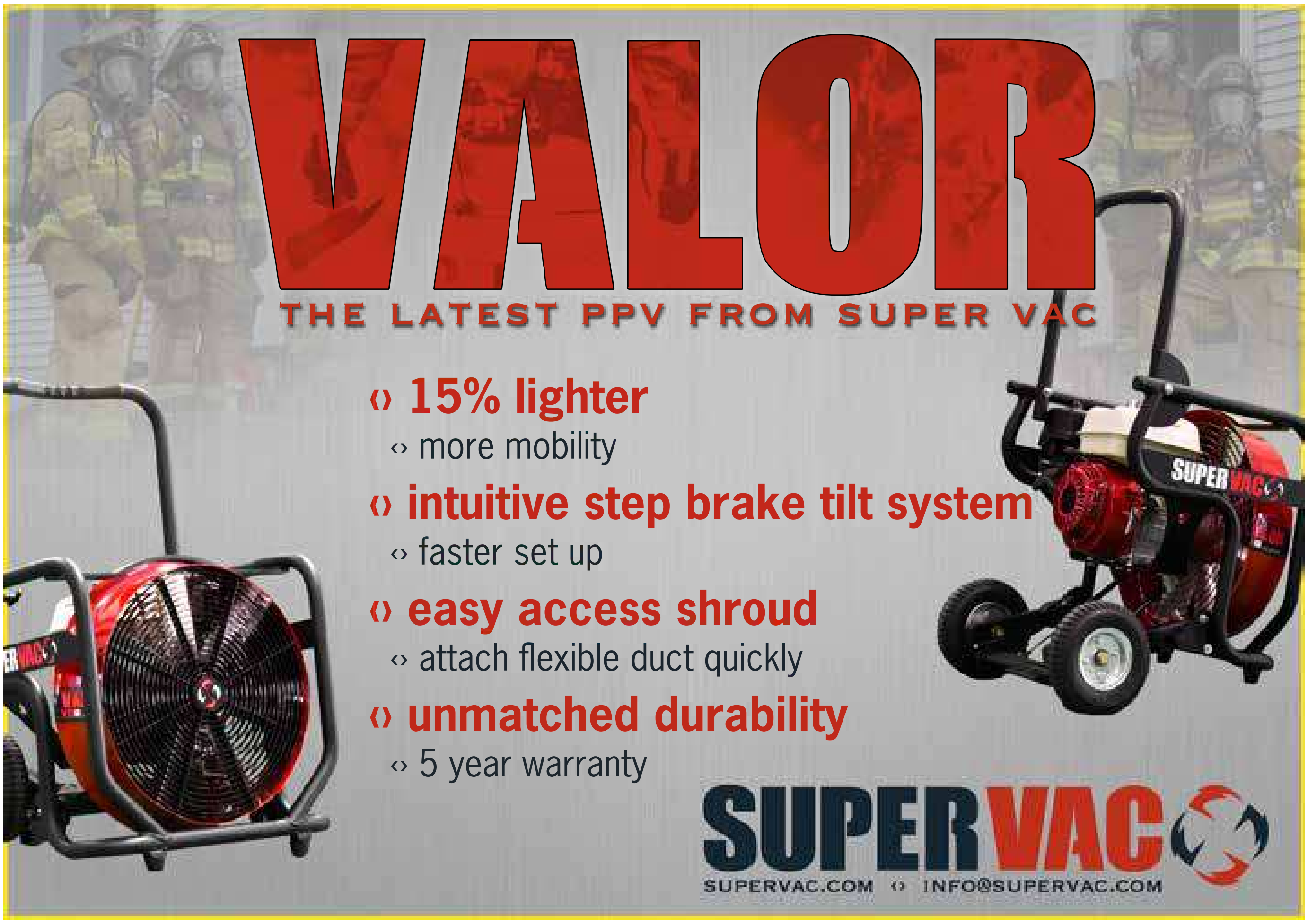
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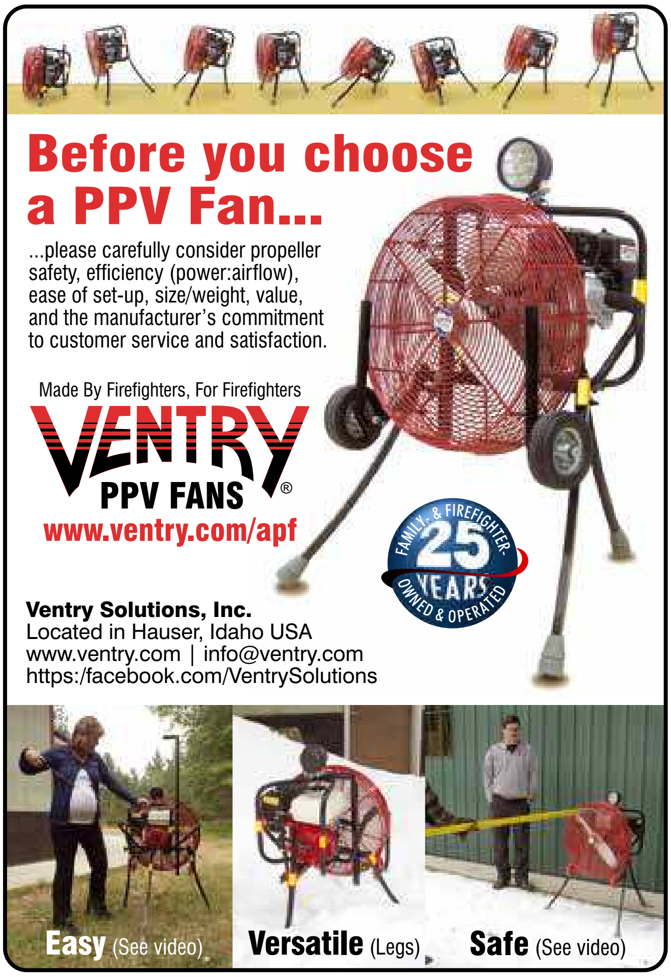

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- Most effective when placed between 2 and 6 m distance from an opening with the optimum between 4 and 5 m. This gives fire-fighters greater space and options for manoeuvrability. The fan can also be positioned as close as 0.90 m.
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- Higher PPV Pressures – Independent third party tests of LEADER fans for pressurising stairwells and hallways to prevent smoke and heat and even fire from progressing into unaffected areas of the halls and stairwells have shown LEADER Easy Pow'Air Technology to be much more effective than larger fans using conventional technology.
- Quick and easy to position – The fan automatically tilts to a +10° optimal position when lifting the carrying handle. It can also be adjusted to between +10° and +20°.

For more information www.leader-group.eu

Tempest

Since 1987, Tempest Technology Corporation has been a leader in the development of innovative ventilation tools for firefighting and industrial work environments. In the beginning, Tempest produced inflator fans for hot air balloonists and now manufactures a wide variety of ventilation tools used by firefighters around the world. This extensive line of equipment designed and built by Tempest all have one common objective; make hazardous environments safer.

Tempest offers a comprehensive line of gasoline, electric and hydraulic driven Power BlowersTM designed for a variety of emergency ventilation applications. Additionally, Tempest VentMaster™ Fire Rescue Saws and their Raptor Carbide Chains are used by thousands of fire departments worldwide for vertical ventilation operations. Tempest also manufactures the MVUTM, the most used mobile ventilation unit in the world with hundreds currently in service in countries such as the US, Japan, Switzerland, Germany, Indonesia and many more.

All Tempest product lines are distributed through a global network of dealers selected for their industry knowledge, professionalism and commitment to customer service. The Tempest dealer network includes the top equipment dealers, installers and apparatus manufacturers in each market we serve.

Tempest Technology team members are committed to providing our customers and end users with the highest level of service and support. We take tremendous pride in our products and the role they play in enhancing safety.

For more information, go to www.tempest.us.com

Renz Feuerwehrservice

Renz Feuerwehrservice develop and manufactures in their own facilities from where they distribute TYPHOON overpressure ventilation systems which are driven by water, motor and electric power. The company also produce mobile pressure foam proportioning systems in accordance with DIN 14430 and EN 16327 and carry out proficient pump repairs to almost all manufacturers and undertake the subsequent tests on their own pump test bench. The conversion of pumps and pipe work is available to the customer individual specification and the company provide sales and service on the whole range of products from Hale, Godiva and Class1.

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Thermal Imagers – Seeing through the Smoke

There is little doubt that thermal imagers (TIs) save lives. Lifting the veil of thick smoke and restoring sight greatly reduces search time, improving the odds of rapidly locating and extricating trapped victims. The primary benefit for using thermal imaging technology is the improvement to firefighter safety. When firefighter visibility is restored, safety is dramatically increased.

Vincent Lee

Vincent Lee is the Head Sales Manager for Bullard Asia Pacific with more than 17 years of engineering and sales knowledge. His technical expertise of the emergency responder market has been instrumental in advancing the use of thermal imagers in the fire service. If you have questions about thermal imaging, you can email him at vincent_lee@bullard.com.

There are a wide variety of thermal imagers available for fire departments today, including handheld thermal imagers that weigh less than a kilogram and incorporate the latest technology in ultra-high resolution detectors, advanced colorization, enhanced image clarity and picture definition. As more and more fire departments look to purchase thermal imagers for their firefighters, manufacturers will continue to push the technology limits of these devices. Let's look at the technology behind thermal imaging.

▼ The Bullard Eclipse® LDX Thermal Imager offers the newest state-of-the-art infrared engine technology with the highest image quality and performance for the fire service.

Image courtesy of Bullard

Thermal Imaging Technology

All objects have a certain temperature and emit waves of energy called infrared radiation. The hotter an object, the more energy waves are emitted. A thermal imager translates these energy waves into a viewable image that displays a "heat picture" of a scene. On the screen of a thermal imager, hottest objects show as white, coolest objects show as black, and features of other objects show as shades of gray.

Since infrared radiation is not blocked by smoke, firefighters can use thermal imagers to see clearly through smoke, which the human eye cannot. This "thermal picture" enables firefighters to find victims faster, identify the source of the fire earlier, and detect structural dangers that put

Image courtesy of Bullard

◀ **Advances in thermal imaging processing technology sharpens the distinction between objects and backgrounds and optimizes the image for greater clarity and detail.**

firefighters at risk. Thermal imagers cannot see through walls, glass or other solid objects, but they can detect heat that has transferred to the surface of an object. The imager's detector receives electromagnetic energy and converts it into an image. Using this technology, firefighters can see heat signatures as small as footprints or handprints.

Thermal radiation is simply a portion of the electromagnetic spectrum. The electromagnetic spectrum describes radiation in terms of energy. Higher energy creates shorter wavelengths and improves penetration. Lower energy produces much longer wavelengths and improves distance.

What are the benefits of this technology for the fire service?

Improved Firefighter Safety

Firefighters used to search burning buildings on their hands and knees, racing against time to find unconscious victims. Today, with the help of thermal imaging technology, firefighters see through smoke, cutting their search time by more[than half and increasing the chances victims will survive. Originally, thermal imaging technology was designed for use in the military in the 1950s and 1960s to help soldiers navigate during night missions and across smoke-covered battle fields. This thermal imaging technology that worked so well for the military was declassified in 1996 and subsequently applied to other applications, including the fire service market.

Of all the operations in which thermal imaging can improve a firefighter's efforts, this technology has the most dramatic impact on search and rescue. Firefighters using thermal imagers can see the scene, which enables them to quickly navigate and identify victims. In addition to allowing firefighters to see through smoke in burning structures, thermal imagers enable first responders to see in the dark to find victims or fellow firefighters who are lost or in danger.

Firefighter disorientation is one of the leading causes of firefighter deaths during structural firefighting. Disorientation occurs when firefighters lose their sense of direction when visibility inside a structure is close to zero. Once disoriented, the firefighter has only a limited amount of time to find his/her way out of the structure or call for assistance. Equipping each firefighter with a thermal imager means firefighters now have more "eyes" in a fire, lessening the likelihood that a firefighter will become disoriented, trapped or lost. Having a thermal imager in the hands of every firefighter improves the efficiency of search operations and lessens property damage because firefighters can move faster through a fire scene.

With more "eyes" in a fire, firefighters have more opportunities to spot various hazards and dangers, such as increasing heat levels, structural weaknesses in the floor or ceilings, hanging electrical lines, stairs or skylights, fallen furniture and other household items. In addition, if a thermal imager is dropped or lost, firefighters can rely on the other thermal imagers to navigate the fire. Equipping each firefighter with a thermal imager increases the speed at which a crew can travel through a fire, improves accuracy, and reduces errors in image interpretation. Putting more thermal imagers into the hands of trained and capable firefighters can dramatically improve the efficiency of fighting fires.

Evolving Technology

Thermal imagers have become much more sophisticated based on the technology improvements and the market's demand for a higher quality TI experience. Today's thermal imagers provide high-quality scene interpretation, record video for training purposes, and give directional guidance to a team that is moving through a structure. As fire departments become more and more accustomed to using thermal imagers, the expectations of improved scene interpretation and higher quality imagery are understandable but also expensive.

Fire departments evaluate the need for thermal imaging based on how deeply ingrained thermal imaging has become within their fire department. Typically thermal imaging is evaluated on four levels: one thermal imager for the entire department; one thermal imager per station; one thermal imager per apparatus; and one thermal imager per firefighter. The fire department that uses the latter model is on the cutting edge of thermal imaging technology. A fire department that has adopted this model has moved beyond search and rescue and has begun to address the issues of firefighter disorientation and firefighter safety by equipping each firefighter with a thermal imager. Everyone engaged in fighting the fire now has sight. This is the future of thermal imaging for the fire service.

Thermal imagers are available at a wide array of price points with different features and options available on different units. Like any tool in the firefighter's arsenal, the expense of purchasing a thermal imager must be balanced against the benefits. Increased firefighter safety and operational efficiency, decreased search times and rekindles all reinforce the value of thermal imaging and why fire departments need this life-saving tool.

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Imagine a Place Where Every Disaster Scenario Really Happens... Krizo

Life is hard on Krizo. The small Pacific island has seen it all: tsunamis, cyclones, mudslides, pandemics, mining disasters, rebel uprisings and volcanic eruptions. If it's a shattering disaster, then it's happened on Krizo. Krizo is God's little punching bag, but thankfully, it doesn't actually exist. Krizo is a virtual simulation environment with Crisis Ready the puppet masters.

Peter Rekers

We've all seen it. You're running an exercise with significant resource commitment and someone tries to wish away the most challenging parts. "Well I'd just hire sixteen helicopters and an aircraft carrier!" The team at Crisis Ready have seen this too often and have even given the phenomenon a name, 'Higginsing' in honour of an exercise participant with a great imagination, who thought he knew best and in doing so threw away many opportunities to learn. Higginsing impacts on everyone in the exercise and on how prepared they are to face the actual challenges of the real world.

In order to address and defeat this a number of 'sandpit' training environments were developed where teams can be tested in a completely unfamiliar environment. The term sandpit or sandbox is often used in software development to describe a testing environment for work-in-progress code. These sandpits are meant to be played in to test people and processes and to build their understanding and ability.

▼ "Information alone saves lives, but there are gaps in the way we gather and share this valuable resource." World Disaster Report, IFRC, 2005.

The Sandpits they have built include a virtual engineering company, Blackhope Engineering Group, whose crisis management plan is always in desperate need of review but the most elaborate sandpit is without doubt 'Krizo', a simulated country.

To make Krizo as realistic as possible, they have developed not just a geographic setting with vulnerabilities built in, but more importantly, a whole cultural backdrop.

Krizo has a national anthem ("We are Krizo rising from the sea..."); a Facebook page, where you will find updates on the recent armed incursion by paramilitary forces from the neighbouring island of Grayza; a native language ("al-la-glar-ga gar-gala." – 'We are different, yet the same."); indigenous flora (Krizo's pygmy pineapples are famous for their sweetness and beautiful reddish-gold flowers); and a religion called Korism, which encourages heavy alcohol consumption at ceremonies.

They have also developed a quasi-United Nations type agency, the International Disaster and Emergency Assistance League (IDEAL) which can provide an umbrella organisation for agencies to deploy under. IDEAL has SOPs

Image courtesy of Crisis Ready

Peter Rekers is Manager of Crisis Ready.

Image courtesy of Crisis Ready

◀ **Every individual in every community has their own identity and expectations. We must learn to listen to know how to help them.**

which have been informally recognised by UNISDR as highly realistic and effective and possibly best-practice.

All this cultural detail and complexity is necessary for a good simulations to work; the point is to teach participants to be sensitive and attentive to victims of disaster, especially if the client organisation created the situation.

One example of how Krizo presents cultural challenges is that gift giving in Krizo is not seen as polite. If you come to my house for dinner and bring a bottle of wine, you are saying my wine is not good enough! So this simple tourist tip might be useful to not upset local sensitivities but now imagine you are on the ground post a disaster and have to distribute food and shelter. It will take carefully considered communications strategies to not insult an already traumatised community

Communicators, policy-makers and emergency relief workers use the island to train in handling the worst events known to humanity.

Krizo's Facebook page recently alerted its followers to a military coup, as part of a training session held in preparation for the G20. The fake crisis triggered protests in Australia, where campaigners called for international intervention. The protests then impacted on the client's operations and by coming from Krizo, nobody was able to say "oh, I know the CEO there. I'll give her a call and sort this out".

We have worked with state government agencies and organisations in almost every sector, from mining to childcare. They are assisted by professional writers and actors to make all scenarios as realistic as possible. You get to experience what it's really like to deal with a mother who's just lost her child.

As this goes to print, Krizo is in the grip of an outbreak of Malsana (meaning "sick" in Esperanto), a realistic Ebola-like disease invented with the assistance of a doctor and microbiologist for a client's simulation.

Crisis Ready currently holds training days on client sites or in hired spaces, but there are plans for a full simulation centre, complete with tin sheds and non-stop rain. They are also in talks with the Queensland University of Technology about running simulations to better prepare journalism graduates for the horrors they may face throughout their careers.

The sandpits have been built as scenario environments where complexities and elements can be added or removed depending on the exercise's specific requirements. As such, they can be used for anything from university courses through to training for teams such as INSARAG to enhance their capability to respond to an unfamiliar place and culture. While all exercises build technical capabilities, how many exercise the cultural interchanges that are so vital to building trust and restoring humanity? Usually, these experiences are only built by experience on operations.

Injecting cultural complexity and sensitivity is vital in conducting quality exercises. When teams deploy to Fukushima, Nepal, Vanuatu, Lockyer Valley or Christchurch, recognition of the differing cultures is as vital as understanding any other element of the threat environment.

Risk Assessment must include the wider environmental factors that can and will impact on response and recovery operations. Recognising the factors that limit response actions or can help as force multipliers will make operations more effective and aid recovery.

Including Public Information as a key element of an exercise is also vital to realism. Matheson and Ryan (2009) identified that around 20% of all findings from Reviews after major incidents, are focussed on public communication aspects. If sufficient commitment is not made to exercising these aspects realistically, then the exercise is neglecting 20% of the lessons that can be learnt and implemented.

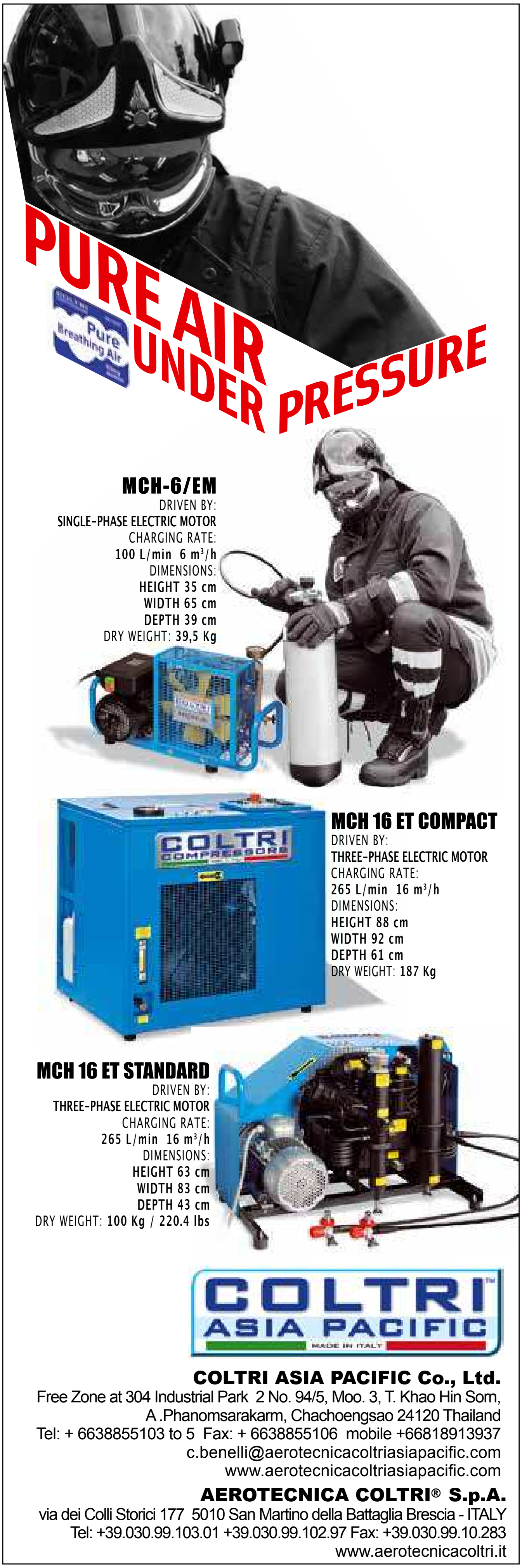
A good starting place in considering the broader public communication factors is the US Military's public information assessment tool which is available online. This tool is used by the public information team to rapidly build a clear picture of the public information environment to enable effective and valuable planning. It addresses such factors as the local media environment, the foreign media that have arrived and how independent they are…do they have mobility, the ability to file and broadcast or will they be reliant on the public information team for assistance. It also looks at the public and media hostility and any areas of growing public outrage that may need to be addressed.

Too often our public information team is really a public relations team, promoting our great work but neglecting the local audience. Public information needs to be about getting messages and information to those affected as well. But the work of public information is actually done by all responders. All responders need to be equipped to communicate, which starts with listening. Listening to an audience or individual builds an understanding of their concerns, what information they need to hear and how it will make sense to them.

Summary

You never know where the next disaster will take you and what the local challenges will be. Krizo is a place where everyone has to learn to listen hard to be able to speak to an audience that will listen, understand and react. It is a place where responders can build their ability to problem solve and strategies to help communities in a way that is targeted, efficient and comprehensive.

For more information, go to www.crisisready.com.au



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DIMENSIONS:
HEIGHT 35 cm
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DEPTH 39 cm
DRY WEIGHT: 39,5 Kg

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DRIVEN BY:
THREE-PHASE ELECTRIC MOTOR
CHARGING RATE:
265 L/min 16 m³/h
DIMENSIONS:
HEIGHT 88 cm
WIDTH 92 cm
DEPTH 61 cm
DRY WEIGHT: 187 Kg

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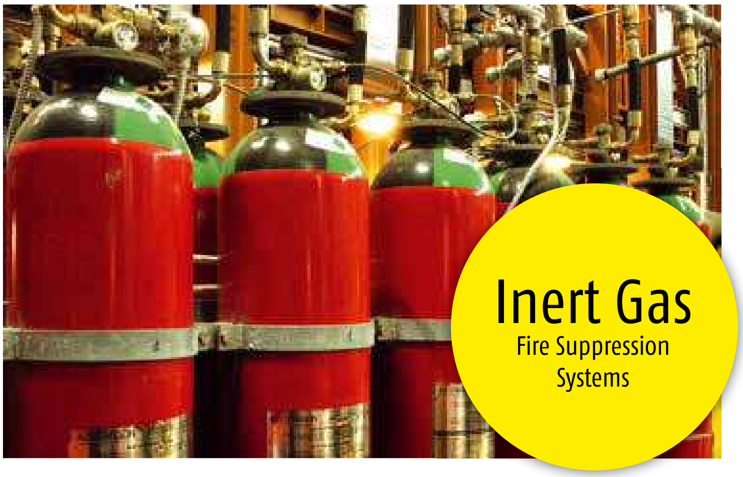

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The story of ADPC: Holding a mirror to disaster risk reduction in Asia

When we think of climate change today, inevitably we draw linkages to global warming. Over the past decade the scientific community and civil society have instilled urgency around the issue of global warming, such that it has pervaded into the psyche of the common person.

Shane Wright AFSM

In the mid-1980's, however, climate change was synonymous with a different anomaly, El Niño. The 1982–1983 El Niño is commonly regarded as the strongest occurrence of El Niño this century. To many people around the world climatic changes were extreme, if not apocalyptic. The coastal deserts of Ecuador and Peru experienced heavy rainfall, transforming them into grassland. Typhoons and monsoon rains swept across the island nations of the central Pacific. Australia and Southeast Asia experienced unprecedented drought leading to widespread bushfires and forest fires. The world was constantly responding to disaster situations. It was during this period that the idea of disaster risk reduction came to be. Instead of responding to disasters after they occurred, losses could be prevented by preparing for disaster. In the same way global warming has turned our attention to climate change and disaster risk reduction today, El Niño stirred global attention then. It was after this period of turmoil, with the world still reeling from El Niño, that Asian Disaster Preparedness Center (ADPC) had its start.

Humble beginnings

Recognizing the urgent need of international assistance for disaster-prone countries in Asia and the Pacific, the United Nations Disaster Relief Office (UNDRO, now UNOCHA), with support from the United Nations Development Programme and the World Meteorological Organization, conducted a feasibility study to strengthen the national disaster management systems in the region. Colonel Brian Ward, a technical advisor for UNDRO at the time, did the consulting work for the study in early 1985, visiting ten countries in the region to clarify their needs in disaster management. Colonel Brian Ward was a visionary for his time and among the first proponents for disaster risk reduction as a means to reduce the

▼ **ADPC helps communities in Asia to better prepare for future disasters and effectively respond when a disaster strikes.**

Image courtesy of Asian Disaster Preparedness Center

Shane Wright is Executive Director of Asian Disaster Preparedness Center.

burden of relief. The findings of the study recommended a regional resource center in Asia, Asian Disaster Preparedness Center. In 1986 ADPC was created under the auspices of UNDRO with non other than Colonel Brian Ward as its first director.

Colonel Brian Ward's ADPC of the late 80s and early 90s was a very different institution from what it is today. While still based on the principle of preparing for disasters before they occurred, ADPC was not yet an independent organization and acted within the premises of the Asian Institute of Technology (AIT). The scope of its work was confined to the provision of training for key actors in national disaster management agencies. These actors would then carry ideas from the training back to their respective countries to formulate more progressive policies in disaster management.

ADPC's scope of work expanded as a result of the United Nation's resolution proclaiming the 1990's as the International Decade for Natural Disaster Reduction (IDNDR). Global interest in disaster risk reduction saw increased support for ADPC to implement programs outside of its usual training activities. Notably the United States Agency for International Development (USAID) supported the implementation of the Asian Urban Disaster Mitigation Program and the Program for Enhancement of Emergency Response. These two programs would continue to be implemented by ADPC into the mid and late 2000's.

Independence and structure

In 1999 ADPC achieved its independence as an organization distinct from the Asian Institute of Technology; The process was motivated by ADPC's quickly expanding program activities. The decision to make the transition was not sudden and had been many years in planning. As early as 1991 the possibility of an independent ADPC had been discussed. As such, it was not a surprise when AIT's board of trustees endorsed the separation of ADPC in 1999, citing that both organizations now served different constituencies and worked towards different visions.

To this day, ADPC's vision is to achieve safer communities and sustainable development through disaster risk reduction. It aims to realize this vision by fulfilling five goals, which are:

- Mainstreaming disaster risk reduction and climate change adaptation in development.
- Establishing systems and capacities that reduce disaster and climate risk impacts.
- Serving as a regional resource center for disaster risk reduction and climate change adaptation.
- Sharing disaster risk reduction and climate change adaptation knowledge and experiences.
- Serving as an incubator for innovation to address challenging and emerging issues in disaster risk reduction and climate change adaptation.

To affect these goals ADPC has organized its activities into three crosscutting core programs: science, systems, and application. The science program enhances the capacity of countries in the utilization of scientific information to understand risk. The systems program strengthens systems for effective management of risk at all levels in countries, with an emphasis on the sub-national and local levels. The application program improves grounded application of disaster risk reduction measures in development.

▼ During ADPC's emergency simulations, community first responders need to deal with multiple situations caused by natural hazards.

Image courtesy of Asian Disaster Preparedness Center

▶ The Regional Consultative Committee on Disaster Management held its 12th meeting in Thimphu, Bhutan in June 2015. The meeting was opened by H.E. Lyonchhen Tshering Tobgay, Prime Minister of Bhutan.

12th
Meeting of the Regional Consultative Committee on Disaster Management
Thimphu, Bhutan

© Image courtesy of Sonam Wangdi

Making a long-term investment in Asia

It is an observable trend that far fewer resources are being spent on preparedness as compared with relief. This owes partly to the fact that while the results of relief can be measured almost immediately in clear tangible terms, the results of preparedness are often intangible and much more difficult to measure. Only till the next major hazard can community-based disaster risk reduction training be truly assessed and it may take up to a decade to assess the effectiveness of an intergovernmental framework for disaster risk reduction. Fortunately, ADPC is among the oldest institutions of its type in Asia and has had an opportunity to see many of its activities yield fruit.

Following the 2004 Indian Ocean Tsunami ADPC also worked with countries in the region to bring lasting technological solutions for early warning. Countries in the region now share the capabilities to receive and analyze seismic, sea level, and deep ocean sensor data to better deliver early warning and prepare for response.

In preparing responders, among ADPC's oldest programs is the Program for Enhancement of Emergency Response implemented with support from USAID. ADPC's involvement with the program in 1998–2014 provided communities with the skills to act as first responders and provided hospitals with the ability to respond to mass casualty incidents. Responders trained under the program have been involved in relief efforts in places including Bangladesh during the Rana Plaza tragedy, and Nepal in the recent earthquake.

On the level of government, ADPC has worked to encourage mainstreaming disaster risk reduction into development. Mainstreaming is the process whereby governments normalize the integration of disaster risk considerations into development planning. By concentrating on resilience, Asia's rapid development can occur in a way that is safe and sustainable. ADPC's work on mainstreaming has largely been through the Mainstreaming Disaster Risk Reduction into Development program implemented under the supervision of the Regional Consultative Committee on Disaster Management.

The Regional Consultative Committee on Disaster Management (RCC) is another longstanding ADPC initiative that has played a central role in the evolution of disaster risk reduction in the region. The RCC is comprised of key government actors in the national disaster management organizations of 26 countries across Asia and meets annually. ADPC serves as the secretariat for the committee that held its 12th meeting in June 2015 in Bhutan.

ADPC has also gained considerable standing as a disaster risk reduction authority in the region having worked with the governments for almost 30 years. ADPC acted as a key consultant in creating the Asia-Pacific input document for the Sendai Framework for Disaster Risk Reduction that was adopted at the 3rd UN World Conference on Disaster Risk Reduction in 2015. The Sendai Framework is the principle document that will guide disaster risk reduction efforts globally in the next 15 years.

The evolution of disaster risk

Since 1986 global understanding of disaster risk and climate change has evolved. Where El Niño created unpredictable climate patterns in the early 80's, today we are able to predict the climatic changes caused by El Niño and prepare for them. A global leaning towards disaster relief is slowly shifting towards disaster risk reduction and has resulted in fewer lives lost during disasters. ADPC too has evolved. By making long-term investments, both in its programs and in its relationships with governments and stakeholders, ADPC has changed from a small resource center to a leading organization at the helm of disaster risk reduction in Asia. However, global understanding of disaster risk must continue to evolve. While fewer lives are now lost in disasters, economic losses are increasing. ADPC also continues to evolve, looking to non-traditional private stakeholders to support programs in economic resilience. Nevertheless, one thing will always remain constant: ADPC will continue to make long-term investments in order to create a safer Asia.

For more information, go to www.adpc.net

Are Field Based Incident Management Systems the Death of Radio?

Combating emergency incidents requires extensive information transfer and collaboration between office based incident managers and field based responders. While radio has been the main collaboration tool for more than 50 years, it is difficult to transfer complex, especially spatial, information via radio. This often results in differences in situational awareness between the office and field, sometimes with life threatening consequences.

Dylan Kendall

Dylan Kendall is Director of Burnology. Dylan has more than 20 years practical experience in bushfire incident management in four Australian states.

More than 30 computerised incident management systems have been developed over the last 15 years. While all are different, incident management systems may be characterised as computer software that enables and automates the transfer of information between spatially separated teams and individuals. They also compile data from various sources so it can be viewed on the one screen.

While incident management systems are most commonly used to collate information in agency, state or country co-ordination centres, the source of this information is office based incident managers who have largely compiled this information by interpreting radio communications from the field. Hence, the information entered into incident management systems is often incomplete or inaccurate. A number of recent developments including, cloud computing, smart phones, tablet computers, increasing mobile phone coverage and mobile satellite internet, is making the use of incident management systems for real time field – office collaboration a practical reality.

Will the increasing field use of incident management systems mean the death of radio?

▼ **The map centric (shared map) user interface of Burnology I Unite. Any user logged into the system can add to/change this map with these changes visible to all users in real time. This enables the spatial collaboration between geographically separated teams and individuals.**

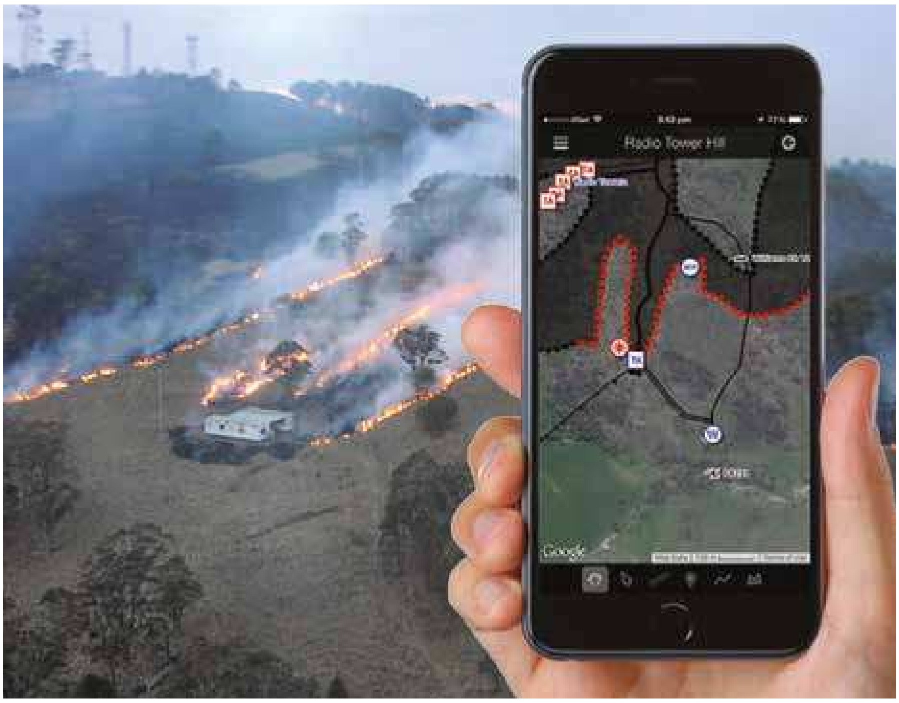
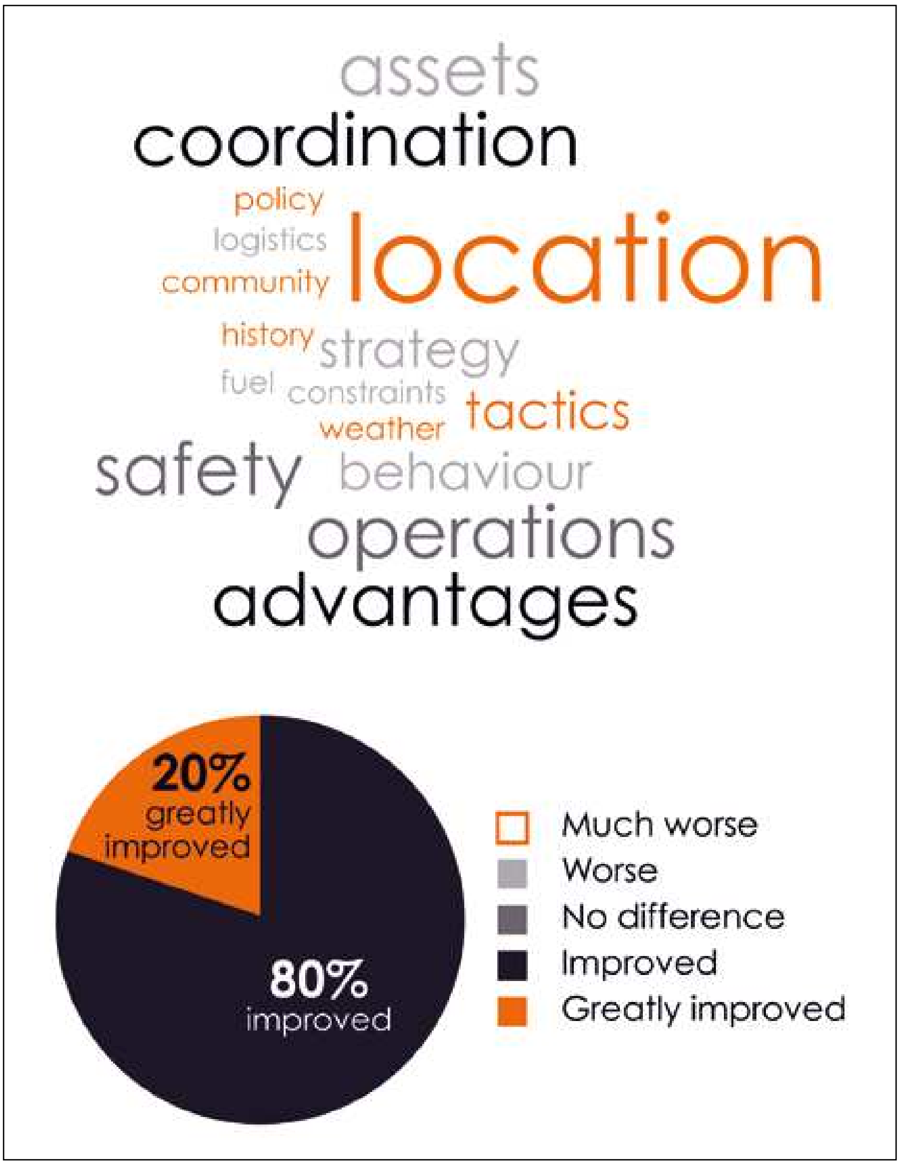


Image courtesy of Burnology

▶ In a recent trial, 100% of those surveyed indicated situational awareness was either improved or greatly improved compared to using radios alone. The main types of information transferred is shown in the word cloud.



© Image courtesy of Burnology

What is an Incident Management System?

An incident management system is computer software that partially automates some of the functions undertaken in incident management. While there is considerable variation between different systems, some common features include:

- Transfer of information between geographically separated users (e.g. maps, messages, tasks, logs).
- Automatic compilation of data from a range of sources so it may be viewed on a single screen (common operating picture).
- Storage of time stamped data that enables the reconstruction of incident progression and development.

Other functions available in some systems include:

- External messaging (e.g. text messages).
- Mapping and data visualisation.
- Resource allocation, tracking and planning.
- Data analytics.
- Development and implementation of plans.
- Workflow management.
- Modelling and simulation.

The real power of incident management systems comes from the integration of different data that allows the identification of patterns and functions that otherwise would not be possible. For example, the ability to send a message to a specific resource type based on its spatial location – this requires the integration of contact, resource type and location data.

Examples of existing incident management systems include WebEOC, Noggin OCA, Emergeo, the Next Generation Incident Command System, firesponse, swiftworks, DisasterLAN, OnScene Explorer, MissionMode, Veoci, Eccentex, Crisisworks, Cobra, Mission Manager, Rhodium Incident Management, Adashi, Atlas Incident Management System, Knowledge Centre, Shelkirk Systems, Alert OpsCentre and Burnology I Unite.

Today, many incident management systems are cloud based and can be run on any web enabled device. In recent years, many incident management systems have included a downloadable app, which enables data to be added to the system from the field.

Field use of incident management systems

Requirements

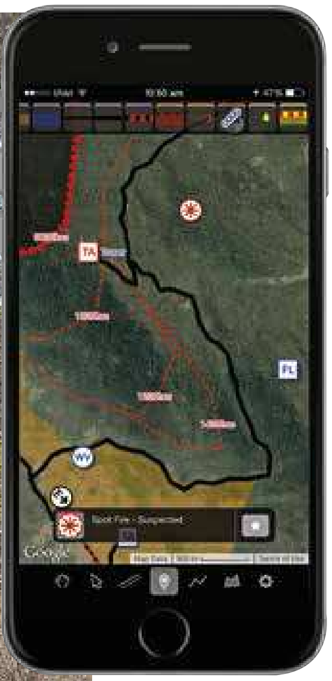
To be used in the field, an incident management system must:

- Be optimised for use on mobile devices (e.g. designed to be visible on small screens, minimise data transfer from the device to the cloud).
- Be quick and simple to use (e.g. minimum use of text data entry, voice to text data entry, data entry via a map) ideally requiring no training.
- Maintain some functionality when out of internet coverage.

While primarily used in (and designed for) incident coordination centres, do any existing incident management systems have these characteristics? Well, yes they do and increasingly these characteristics are being built into incident management systems.

Obstacles

While remote area access to the internet remains the most significant challenge, some of the greatest obstacles to the field use of incident management systems are cultural, including adapting to a new way of doing things. Are incident responders ready to make such a change?



Images courtesy of Burnology

◀ **A incident responder using an incident management system in the field on a tablet computer. One of the most powerful things field based incident management systems enable is office based incident managers and field based incident responders to have a radio conversation while looking at exactly the same real time information.**

A few practices that have recently become common suggest they are:

- Drawing on hard copy maps, taking photos of those maps and texting them.
- Taking and texting photos of the incident itself.

For field responders to use incident management systems, they must feel it will make their own job easier. This usually means the incident management system must allow three way communication:

- Field to office.
- Office to field.
- Field to field.

Unfortunately, most existing incident management systems are designed to 'feed information up the line' and are not designed for office to field and field to field communication.

Benefits

Benefits to an agency from the field use of incident management systems include:

Better shared situational awareness between the office and field because complex data, including spatial data and photographs, can be shared in real time.

Data is entered once which is more efficient than transferring information by radio, transcribing it and then manually entering it into another system.

Everything related to an incident is kept in the one place – a single source of truth.

All data relating to an incident is stored electronically making searching and analysing easier.

Case study of the field use of an incident management system

Burnology | Unite, a map centric incident management system specifically designed for field use, was trialled in the Australian Capital Territory during a wildfire suppression exercise.

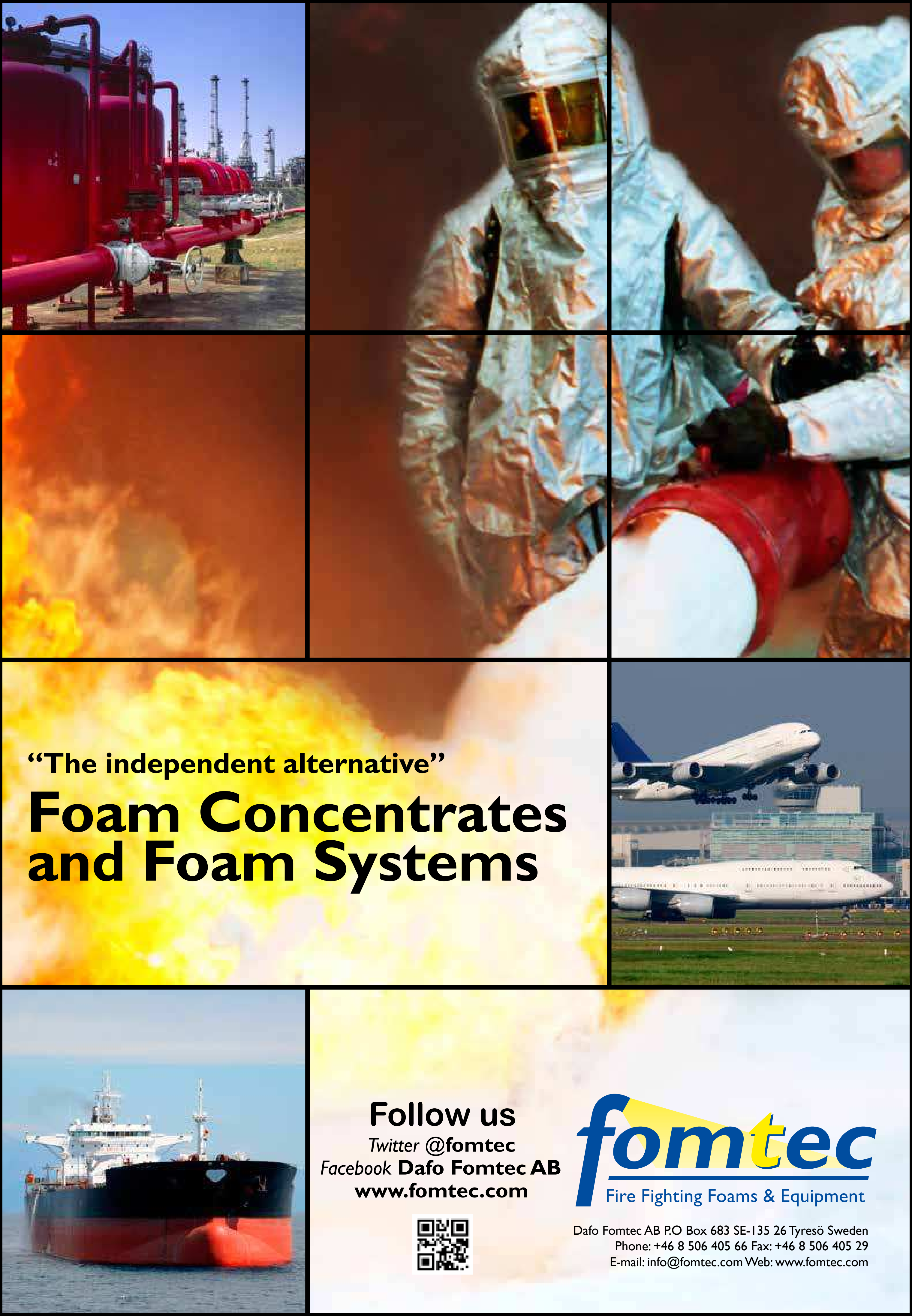
The main user interface of the system consists of a shared map that both office and field staff can make changes to with these changes visible to all users in real time. The shared map also provides access to other collaboration tools such as automatic resource tracking, messaging, tasking, intelligence log and photographs.

A survey conducted after the exercise found 90% of participants believed the system either improved or greatly improved information transfer and 100% believed the system improved or greatly improved situational awareness. The main information transferred using the system related to fire location, co-ordination, advantages, operations, safety, and assets. There was no significant difference in responses based on the role played by the participant (office or field) or their level of experience.

So is radio dead?

Field based incident management systems are not a direct competitor with radios but are a complimentary technology. Indeed, it is believed one of the most powerful things field based incident management systems enable is office based incident managers and field based incident responders to have a radio conversation while looking at exactly the same real time information (e.g. an annotated map). The field use of incident management systems does however throw out a huge challenge/opportunity to radio companies. That is, the development of technology that will enable reliable access to the internet, that incident management systems require, via radio networks. This will overcome what, despite all the recent developments, remains the biggest constraint to the field based use of incident management systems, that is, access to the internet in remote areas.

For more information, go to www.burnology.com



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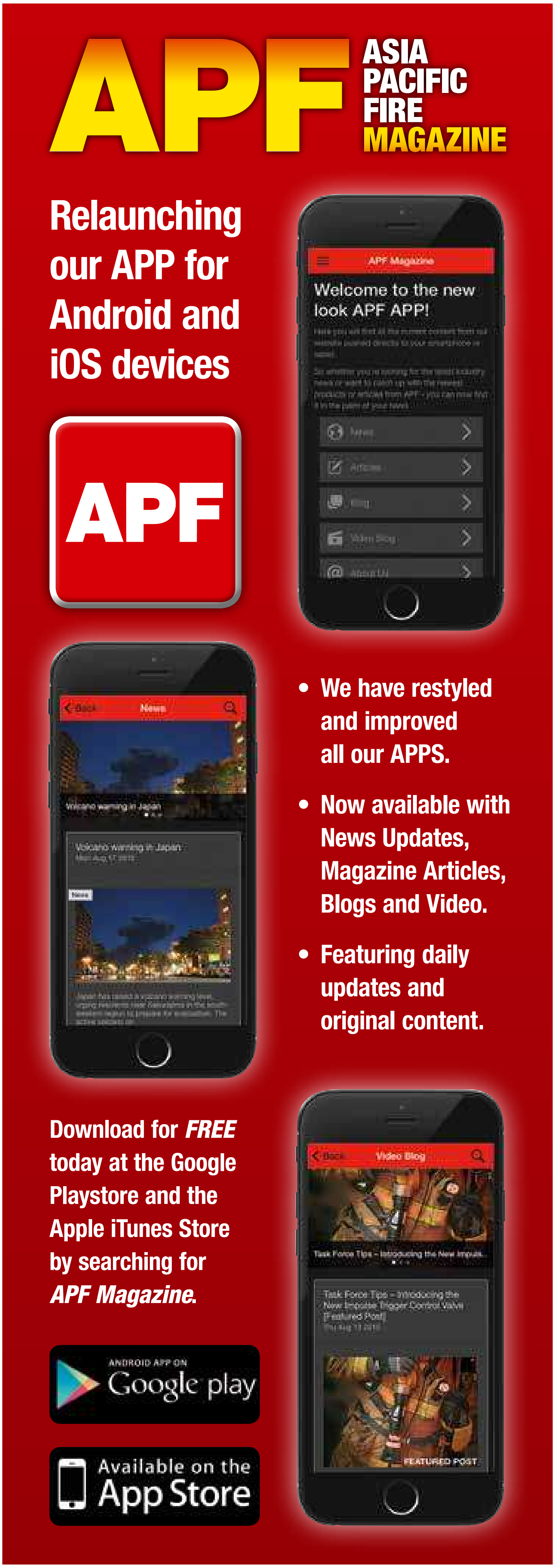

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Coltraco Ultrasonics	11
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Cutters Edge	23
Dafo Fomtec AB	95
Dr. Sthamer Hamburg	17
Dynax Corporation	4
E2S	39
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FFE	39
Firemiks AB	25
Fire Protection Association Australia	57
Firetrace International	6
Gielle Group	88
Hainsworth	45
HD Fire Protect Pvt Ltd.	57
Holmatro Rescue Equipment	54
Husqvarna Fra East Co., Ltd.	21
Hytrans Systems b.v.	67
Janus Fire Systems	13
Leader S.A.S.	79
LHD Group Hong Kong Ltd.	48 / 49
MEFSEC	61
Mercedes Textiles Limited	2
Pacific Helmets (NZ) Ltd.	50
PAB Akrapovic	47
PAC Fire Australia	30 / 31
Performance Advantage Company	58
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Rosenbauer International	53
Saphire Complete Training Concepts	67
Sicor S.p.A.	42
SuperVac	77
Task Force Tips, Inc.	IFC / 1
Teikoku I-Sen Co.	32
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Texas A & M Emergency Services Training Institute	83
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